

# THE IDEAL FITTER

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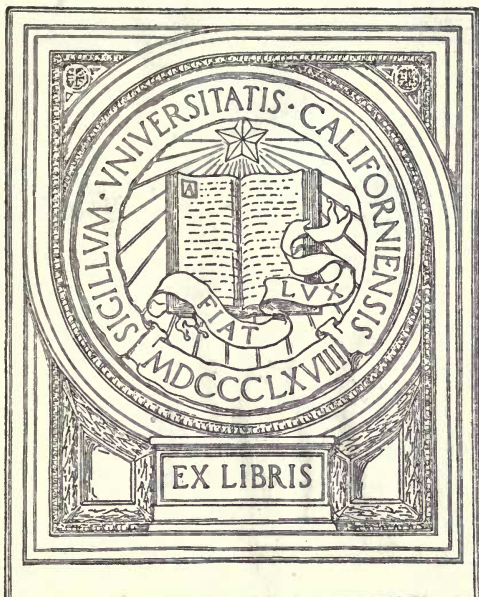
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# The Ideal Fitter

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**A**LL products listed or illustrated in this catalogue have been designed and made with the most particular manufacturing care and have been rigidly tested before offering them for sale. We are therefore confident that the Boilers, Radiators and Specialties herein listed will appeal to the best judgment of all who desire to plan and install strictly first-class heating outfits.

AMERICAN Radiators are made in America in six plants exclusively; IDEAL Boilers are made in four plants devoted to that product only. Similar products are made in four allied plants in Europe. We are therefore constantly in close touch with the needs and most advanced practices of the heating industry of two continents. This broad knowledge of modern requirements, coupled with the best materials, scientific tests and concentration in manufacturing methods, enables us to produce the most reliable heating appliances in the market.

With these extensive foundries, twenty offices, thirty warehouses (widely distributed throughout the United States), and a large force of traveling salesmen, we are equipped as no other concern in this business to give the most acceptable and prompt service to all alike, and at all times.

All orders are welcome—large or small.

Faithfully yours,

**AMERICAN RADIATOR COMPANY**

August 1, 1908.

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Discounts quoted to the regular Trade only.

# Graded Ratings of Ideal Steam Boilers

We here present graded lists of the ratings of IDEAL Boilers running from the lowest to the highest capacities, to enable the Heating Contractor to quickly locate the available patterns in the capacity desired.

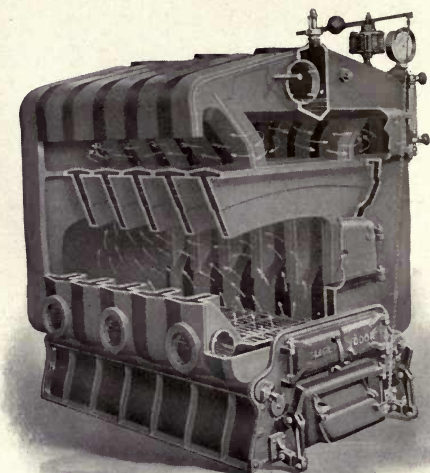
IDEAL Coke Boilers and IDEAL Water Heaters are not included in these graded lists of ratings.

Ratings	Number	Name	Page	Ratings	Number	Name	Page
175	1015	Premier	23	800	2027	Premier	23
200	2015	Premier	23	800	1-28-S	Arco	19
225	3015	Premier	23	800	S-22-5	Sectional	7
275	1018	Premier	23	850	3027	Premier	23
275	1-19-S	Arco	19	900	2-28-S	Arco	19
300	1500	Junior	26	900	4027	Premier	23
300	2018	Premier	23	1000	1-31-S	Arco	19
300	S 15-4	Sectional	7	1000	3-28-S	Arco	19
325	3018	Premier	23	1000	S-22-6	Sectional	7
340	1600	Junior	26	1200	S-22-7	Sectional	7
350	2-19-S	Arco	19	1250	1-34-S	Arco	19
400	1021	Premier	23	1275	2-31-S	Arco	19
400	1-22-S	Arco	19	1300	S-28-5	Sectional	7
400	3-19-S	Arco	19	1400	3-31-S	Arco	19
425	2021	Premier	23	1400	S-22-8	Sectional	7
425	S-15-5	Sectional	7	1500	2-34-S	Arco	19
450	3021	Premier	23	1625	S-28-6	Sectional	7
475	4021	Premier	23	1650	3-34-S	Arco	19
500	1-25-S	Arco	19	1950	S-28-7	Sectional	7
525	1024	Premier	23	2100	S-36-5	Sectional	7
525	2-22-S	Arco	19	2275	S-28-8	Sectional	7
525	1800	Junior	26	2625	S-36-6	Sectional	7
550	S-15-6	Sectional	7	3150	S-36-7	Sectional	7
575	3-22-S	Arco	19	3675	S-36-8	Sectional	7
575	2024	Premier	23	4200	S-36-9	Sectional	7
575	1900	Junior	26	4750	S-48-6	Sectional	7
625	3024	Premier	23	5700	S-48-7	Sectional	7
625	2-25-S	Arco	19	6650	S-48-8	Sectional	7
650	4024	Premier	23	7600	S-48-9	Sectional	7
700	3-25-S	Arco	19	8550	S-48-10	Sectional	7
750	1027	Premier	23				

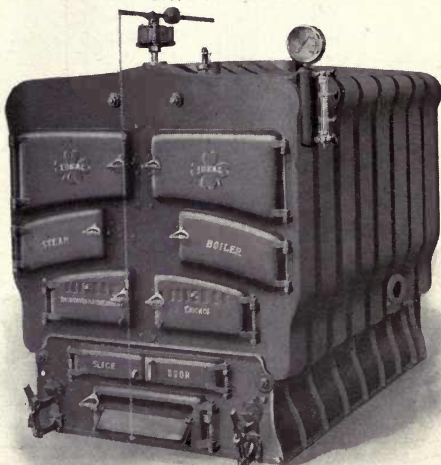
# Graded Ratings of Ideal Water Boilers

Ratings	Number	Name	Page	Ratings	Number	Name	Page
300	1115	Premier	23	1250	25-3-W	Standard	16
325	2115	Premier	23	1300	W-22-5	Sectional	9
350	3115	Premier	23	1325	2127	Premier	23
400	15-1-W	Standard	16	1325	1-28-W	Arco	19
425	15-2-W	Standard	16	1350	25-4-W	Standard	16
450	1118	Premier	23	1400	3127	Premier	23
450	1-19-W	Arco	19	1425	25-5-W	Standard	16
500	1501	Junior	26	1475	4127	Premier	23
500	2118	Premier	23	1500	2-28-W	Arco	19
500	17-3-W	Standard	16	1500	28-3-W	Standard	16
500	W-15-4	Sectional	9	1600	28-4-W	Standard	16
550	3118	Premier	23	1650	1-31-W	Arco	19
550	17-4-W	Standard	16	1650	3-28-W	Arco	19
575	2-19-W	Arco	19	1650	W-22-6	Sectional	9
600	1121	Premier	23	1700	28-5-W	Standard	16
600	17-5-W	Standard	16	1750	31-3-W	Standard	16
600	1601	Junior	26	1950	31-4-W	Standard	16
650	2121	Premier	23	2000	W-22-7	Sectional	9
650	1-22-W	Arco	19	2050	31-5-W	Standard	16
650	3-19-W	Arco	19	2075	1-34-W	Arco	19
700	W-15-5	Sectional	9	2100	2-31-W	Arco	19
700	3121	Premier	23	2150	W-28-5	Sectional	9
750	4121	Premier	23	2325	3-31-W	Arco	19
750	19-3-W	Standard	16	2350	W-22-8	Sectional	9
825	1-25-W	Arco	19	2350	34-3-W	Standard	16
825	19-4-W	Standard	16	2475	2-34-W	Arco	19
875	1124	Premier	23	2500	34-4-W	Standard	16
875	2-22-W	Arco	19	2650	34-5-W	Standard	16
875	22-3-W	Standard	16	2675	W-28-6	Sectional	9
875	1801	Junior	26	2725	3-34-W	Arco	19
900	1901	Junior	26	3200	W-28-7	Sectional	9
900	19-5-W	Standard	16	3450	W-36-5	Sectional	9
900	W-15-6	Sectional	9	3725	W-28-8	Sectional	9
950	3-22-W	Arco	19	4325	W-36-6	Sectional	9
950	22-4-W	Standard	16	5200	W-36-7	Sectional	9
950	2124	Premier	23	6050	W-36-8	Sectional	9
1025	3124	Premier	23	6925	W-36-9	Sectional	9
1025	2-25-W	Arco	19	7825	W-48-6	Sectional	9
1025	22-5-W	Standard	16	9400	W-48-7	Sectional	9
1075	4124	Premier	23	10975	W-48-8	Sectional	9
1150	3-25-W	Arco	19	12550	W-48-9	Sectional	9
1250	1127	Premier	23	14125	W-48-10	Sectional	9

# Ideal Sectional Steam Boilers



No. S-36-7 Boiler



No. S-48-8 Boiler (Patented)



# Ideal Sectional Steam Boilers

No. Including Sections	Length Total, In.	Height Total, In.	Width Total, In.	Fire-Pot Inches
S-15-4	40 $\frac{3}{8}$	61 $\frac{1}{2}$	38 $\frac{3}{4}$	19 x 18
S-15-5	47 $\frac{1}{8}$	61 $\frac{1}{2}$	38 $\frac{3}{4}$	19 x 25
S-15-6	53 $\frac{3}{8}$	61 $\frac{1}{2}$	38 $\frac{3}{4}$	19 x 31
S-22-5	53 $\frac{1}{4}$	67 $\frac{1}{4}$	45 $\frac{1}{4}$	25 x 28
S-22-6	60 $\frac{1}{4}$	67 $\frac{1}{4}$	45 $\frac{1}{4}$	25 x 35
S-22-7	67 $\frac{1}{4}$	67 $\frac{1}{4}$	45 $\frac{1}{4}$	25 x 42
S-22-8	74 $\frac{1}{4}$	67 $\frac{1}{4}$	45 $\frac{1}{4}$	25 x 49
S-28-5	60	75 $\frac{5}{8}$	53 $\frac{1}{2}$	33 x 32
S-28-6	68	75 $\frac{5}{8}$	53 $\frac{1}{2}$	33 x 40
S-28-7	76	75 $\frac{5}{8}$	53 $\frac{1}{2}$	33 x 48
S-28-8	84	75 $\frac{5}{8}$	53 $\frac{1}{2}$	33 x 56
S-36-5	69 $\frac{3}{4}$	83	64	41 x 36
S-36-6	78 $\frac{7}{8}$	83	64	41 x 45
S-36-7	88	83	64	41 x 54
S-36-8	97 $\frac{1}{8}$	83	64	41 x 63
S-36-9	106 $\frac{1}{4}$	83	64	41 x 73
S-48-6	92	97	80	50 x 53
S-48-7	102 $\frac{3}{4}$	97	80	50 x 64
S-48-8	114	97	80	50 x 75
S-48-9	124 $\frac{1}{4}$	97	80	50 x 86
S-48-10	135	97	80	50 x 96

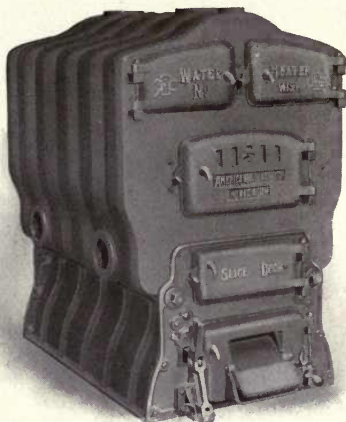
No. Including Sections	Water Line, In.	Outlets Inches	Smoke- Pipe	Ratings (Note)	Price Complete
S-15-4	38 $\frac{3}{4}$	2-3	8	300	\$ 157.00
S-15-5	38 $\frac{3}{4}$	2-3	8	425	210.00
S-15-6	38 $\frac{3}{4}$	2-3	8	550	245.00
S-22-5	45	2-4	10	800	340.00
S-22-6	45	2-4	10	1000	400.00
S-22-7	45	3-4	10	1200	460.00
S-22-8	45	3-4	10	1400	520.00
S-28-5	52	2-4	12	1300	490.00
S-28-6	52	2-4	12	1625	587.00
S-28-7	52	3-4	12	1950	684.00
S-28-8	52	3-4	12	2275	781.00
S-36-5	60	2-5	15	2100	730.00
S-36-6	60	2-5	15	2625	845.00
S-36-7	60	3-5	15	3150	960.00
S-36-8	60	3-5	15	3675	1075.00
S-36-9	60	4-5	15	4200	1190.00
S-48-6	70	2-6	21	4750	1294.00
S-48-7	70	2-6	21	5700	1484.00
S-48-8	70	3-6	21	6650	1674.00
S-48-9	70	3-6	21	7600	1864.00
S-48-10	70	3-6	21	8550	2054.00

For each supply outlet on top of Boiler there is a corresponding return inlet in either side. Extra tappings provided if desired. Do not bush flow-pipe outlets—connect all of them full size to the main. Above are hard-coal ratings—soft coal requires size larger boiler. See Note on ratings, page 33.

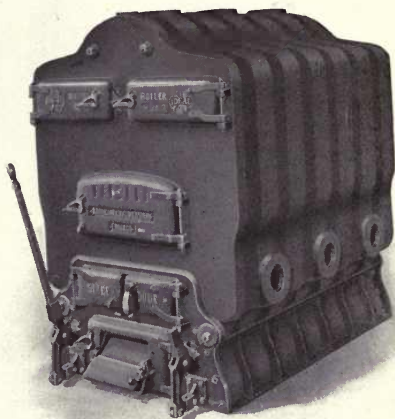
For price list of boiler parts, see pages 192 to 210, inclusive.

For Wood Burning.—On special order the 22 inch Boilers are fitted with special grates and 11 $\frac{1}{8}$  x 18-inch fire-door; 28-inch with 12 $\frac{7}{8}$  x 20-inch fire door.

## Ideal Sectional Water Boilers



No. W-15-6 Boiler



No. W-28-7 Boiler

# Ideal Sectional Water Boilers

No. Including Sections	Length Total, In.	Height Total, In.	Width Total, In.	Fire-Pot Inches
W-15-4	40 $\frac{3}{8}$	42 $\frac{1}{2}$	27 $\frac{1}{2}$	19 x 18
W-15-5	47 $\frac{1}{8}$	42 $\frac{1}{2}$	27 $\frac{1}{2}$	19 x 25
W-15-6	53 $\frac{3}{8}$	42 $\frac{1}{2}$	27 $\frac{1}{2}$	19 x 31
W-22-5	53 $\frac{1}{4}$	52 $\frac{1}{4}$	36	25 x 28
W-22-6	60 $\frac{1}{4}$	52 $\frac{1}{4}$	36	25 x 35
W-22-7	67 $\frac{1}{4}$	52 $\frac{1}{4}$	36	25 x 42
W-22-8	74 $\frac{1}{4}$	52 $\frac{1}{4}$	36	25 x 49
W-28-5	60	60 $\frac{5}{8}$	44	33 x 32
W-28-6	68	60 $\frac{5}{8}$	44	33 x 40
W-28-7	76	60 $\frac{5}{8}$	44	33 x 48
W-28-8	84	60 $\frac{5}{8}$	44	33 x 56
W-36-5	69 $\frac{3}{4}$	70	53 $\frac{1}{4}$	41 x 36
W-36-6	78 $\frac{3}{8}$	70	53 $\frac{1}{4}$	41 x 45
W-36-7	88	70	53 $\frac{1}{4}$	41 x 54
W-36-8	97 $\frac{1}{8}$	70	53 $\frac{1}{4}$	41 x 63
W-36-9	106 $\frac{1}{4}$	70	53 $\frac{1}{4}$	41 x 73
W-48-6	92	81 $\frac{3}{4}$	68	50 x 53
W-48-7	102 $\frac{3}{4}$	81 $\frac{3}{4}$	68	50 x 64
W-48-8	114	81 $\frac{3}{4}$	68	50 x 75
W-48-9	124 $\frac{1}{4}$	81 $\frac{3}{4}$	68	50 x 86
W-48-10	135	81 $\frac{3}{4}$	68	50 x 96

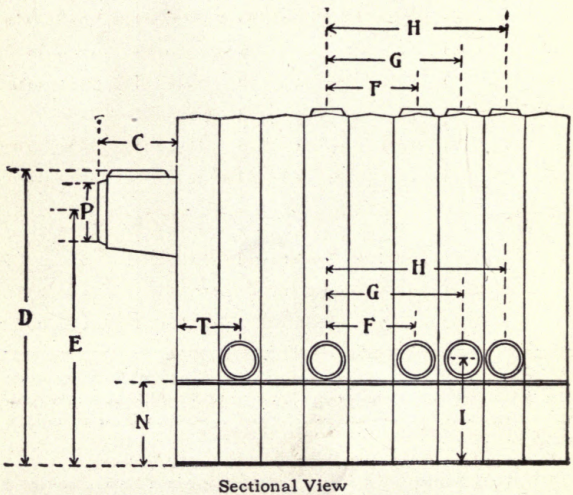
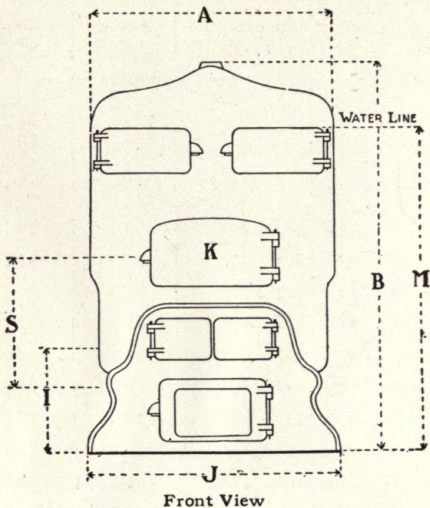
No. Including Sections	Outlets, Inches	Smoke- Pipe	Ratings (Note)	Price Complete
W-15-4	2-3	8	500	\$ 147.00
W-15-5	2-3	8	700	200.00
W-15-6	2-3	8	900	235.00
W-22-5	2-4	10	1300	330.00
W-22-6	2-4	10	1650	390.00
W-22-7	3-4	10	2000	450.00
W-22-8	3-4	10	2350	510.00
W-28-5	2-4	12	2150	480.00
W-28-6	2-4	12	2675	577.00
W-28-7	3-4	12	3200	674.00
W-28-8	3-4	12	3725	761.00
W-36-5	2-5	15	3450	710.00
W-36-6	2-5	15	4325	825.00
W-36-7	3-5	15	5200	940.00
W-36-8	3-5	15	6050	1055.00
W-36-9	4-5	15	6925	1170.00
W-48-6	2-6	21	7825	1274.00
W-48-7	2-6	21	9400	1464.00
W-48-8	3-6	21	10975	1654.00
W-48-9	3-6	21	12550	1844.00
W-48-10	3-6	21	14125	2034.00

For each supply outlet on top of Boiler there is a corresponding return inlet in either side. Extra tappings provided if desired. Above are hard-coal ratings—soft coal requires size larger Boiler. See Note on ratings, page 33.

For price list of boiler parts, see pages 192 to 210, inclusive.

For Wood Burning.—On special order the 22-inch Boilers are fitted with special grates and 11 $\frac{1}{8}$  x 18-inch fire door; 28-inch with 12 $\frac{3}{8}$  x 20-inch fire door.

## Sectional Boiler Measurements



For details of measurements see page opposite.



# Sectional Boiler Measurements

Table of distances between points as noted upon the outline drawings of IDEAL Sectional Boilers shown on opposite page. These measurements are all given in inches.

	15-in. Boil'rs		22-in. Boil'rs		28-in. Boil'rs		36-in. Boil'rs		48-in. Boil'rs	
	Water	Steam	Water	Steam	Water	Steam	Water	Steam	Water	Steam
A	27½	28½	36¼	36¼	44½	44½	53¼	54¼	68	69
B	42⅞	46⅞	52¼	52¼	60⅝	60⅝	69⅝	69⅝	81¼	81¼
† C	13⅞	13⅞	15¼	15¼	18⅝	18⅝	21⅞	21⅞	27¼	27¼
‡ D	41⅝	41⅝	47¼	47¼	55⅝	55⅝	63⅝	63⅝	73⅝	73⅝
E	34¾	34¾	40½	40½	46¼	46¼	52⅞	52⅞	59½	59½
F	12½	12½	14⅝	14⅝	16	16	18¼	18¼	21½	21½
G	18¾	18¾	21¼	21¼	24	24	27⅝	27⅝	32¼	32¼
H	25	25	28¼	28¼	32	32	36½	36½	43	43
I	16⅞	16⅞	16¾	16¾	17⅝	17⅝	18⅞	18⅞	22⅝	22⅝
J	23¾	23¾	29⅝	29⅝	37⅝	37⅝	45⅞	45⅞	58⅝	58⅝
K	8x14	8x14	§8x14	§8x14	§9x18	§9x18	10x20	10x20	11x19	11x19
M	.....	38¼	.....	45	.....	52	.....	60	.....	70
N	11¼	11¼	9½	9½	10	10	10⅞	10⅞	14⅞	14⅞
P	8	8	10	10	12	12	§15	§15	21	21
S	13¼	13¼	14½	14½	16	16	18⅞	18⅞	17¾	17¾
T	7½	7½	8½	8½	9½	9½	10⅝	10⅝	12¾	.....

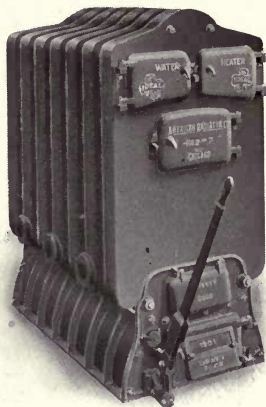
† Measured without Smoke Hood Cover.

‡ Measured with Smoke Hood Cover on.

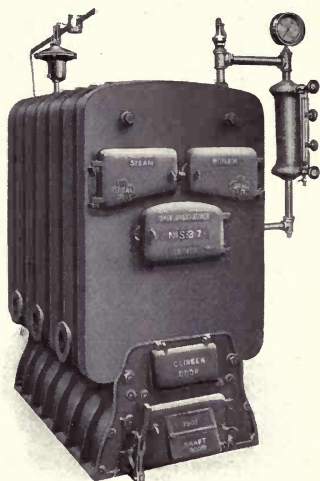
§ For Wood, Feed Door K in 22-inch Boilers is 11⅝x18 inches; in 28-inch Boilers, 12⅞ x 20 inches.

Do not bush the flow-pipe outlets of Steam Boilers; connect all of them full size to the main.

# Ideal Sectional Coke Boilers



No. W-2-7 Water Boiler



No. S-3-7 Steam Boiler

## Ideal Coke Water Boilers

No.	Sections	Length with Smoke Hood, Inches	Total Height Inches	Total Width Inches	Founda- tion Inches	Grate Inches	Average Firepot Inches	Outlets, In.	Smoke Pipe Inches	Rat- ings (See Note)	Price Complete
W-2-4	4	35	49	24	23 x 24	10 x 16	15 x 16	2-3	7	375	\$130 00
W-2-5	5	40	49	24	28 x 24	10 x 21	15 x 21	2-3	7	500	160 00
W-2-6	6	45	49	24	33 x 24	10 x 26	15 x 26	2-3	7	625	190 00
W-2-7	7	50	49	24	38 x 24	10 x 32	15 x 32	2-3	7	750	220 00
W-3-5	5	43	52	31	32 x 30	12 x 25	18 x 25	2-3	9	825	250 00
W-3-6	6	50	52	31	38 x 30	12 x 31	18 x 32	2-3	9	1000	285 00
W-3-7	7	56	52	31	45 x 30	12 x 38	18 x 38	2-3	9	1150	320 00
W-4-5	5	50	63	36	36 x 36	17 x 29	24 x 29	2-4	12	1325	365 00
W-4-6	6	57	63	36	44 x 36	17 x 36	24 x 36	2-4	12	1650	435 00
W-4-7	7	64	63	36	51 x 36	17 x 44	24 x 44	2-4	12	2000	505 00
W-5-5	5	52	70	48	40 x 42	33 x 22	33 x 32	2-4	12	2325	590 00
W-5-6	6	60	70	48	48 x 42	41 x 22	41 x 32	2-4	12	2800	675 00
W-5-7	7	69	70	48	57 x 42	49 x 22	49 x 32	3-4	12	3300	760 00
W-5-8	8	77	70	48	65 x 42	58 x 22	58 x 32	3-4	12	3800	845 00
W-5-9	9	85	70	48	73 x 42	66 x 22	66 x 32	4-4	12	4300	930 00

## Ideal Coke Steam Boilers

No.	Sections	Length with Smoke Hood, In	Total Height Inches	Total Width Inches	Height Water Line, Inches	Founda- tion Inches	G-rate Inches	Average Firepot Inches	Outlets, In.	Smoke Pipe Inches	Rat- ings (See Note)	Price Complete
S-2-4	4	35	65	35	44	23 x 24	10 x 16	15 x 16	2-3	7	225	\$140 00
S-2-5	5	40	65	35	44	28 x 24	10 x 21	15 x 21	2-3	7	300	170 00
S-2-6	6	45	65	35	44	33 x 24	10 x 26	15 x 26	2-3	7	375	200 00
S-2-7	7	50	65	35	44	38 x 24	10 x 32	15 x 32	2-3	7	450	230 00
S-3-5	5	43	67	42	46	32 x 30	12 x 25	18 x 25	2-3	9	500	260 00
S-3-6	6	50	67	42	46	38 x 30	12 x 31	18 x 31	2-3	9	600	295 00
S-3-7	7	56	67	42	46	45 x 30	12 x 38	18 x 38	2-3	9	700	330 00
S-4-5	5	50	76	47	56	36 x 36	17 x 29	24 x 29	2-4	12	800	375 00
S-4-6	6	57	76	47	56	44 x 36	17 x 36	24 x 36	2-4	12	1000	445 00
S-4-7	7	64	76	47	56	51 x 36	17 x 44	24 x 44	2-4	12	1200	515 00
S-5-5	5	52	82	59	62	40 x 42	33 x 22	33 x 32	2-4	12	1400	600 00
S-5-6	6	60	82	59	62	48 x 42	41 x 22	41 x 32	2-4	12	1700	690 00
S-5-7	7	69	82	59	62	57 x 42	49 x 22	49 x 32	3-4	12	2000	780 00
S-5-8	8	77	82	59	62	65 x 42	58 x 22	58 x 32	3-4	12	2300	870 00
S-5-9	9	85	82	59	62	73 x 42	66 x 22	66 x 32	4-4	12	2600	960 00

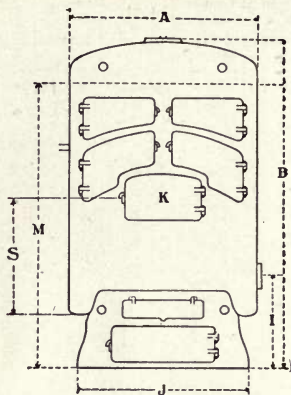
For additional measurements, see pages 14 and 15.

These Boilers also yield good results when used with hard coal, the magazine feature enabling the Boilers to run a long time with one firing. The construction of this Boiler makes it adaptable for burning gas as fuel.

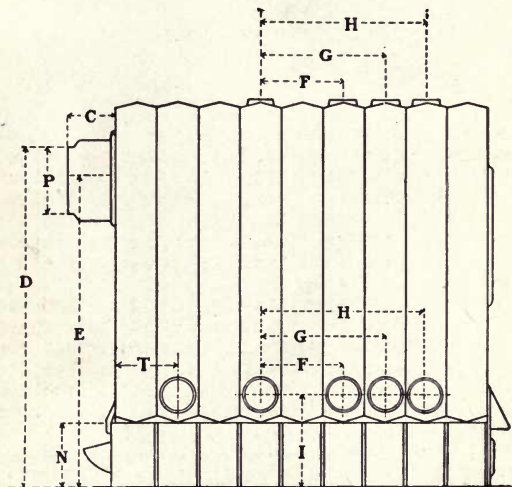
Do not bush flow-pipe outlets of the Steam Boilers—connect all of them full size to the main (see page 224).

*See Note, page 33.*

# Sectional Coke Boiler Measurements



Front View.



Sectional View.

For details of measurements see page opposite.



# Sectional Coke Boiler Measurements

Table of distances between points as noted upon the outline drawings of IDEAL Coke Boilers shown on opposite page. These measurements are given in inches.

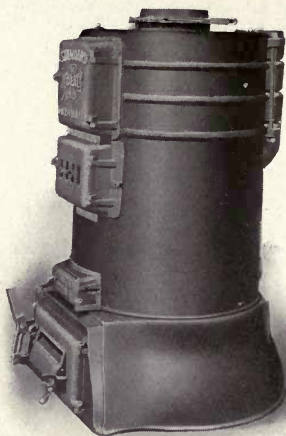
	No. 2		No. 3	
	Water	Steam	Water	Steam
A	24	24	30 $\frac{1}{2}$	30 $\frac{1}{2}$
B	49 $\frac{1}{4}$	53 $\frac{15}{16}$	51 $\frac{3}{4}$	56 $\frac{1}{4}$
C*	12 $\frac{3}{4}$	12 $\frac{3}{4}$	13 $\frac{3}{4}$	13 $\frac{3}{4}$
D	45 $\frac{3}{4}$	45 $\frac{3}{4}$	48 $\frac{5}{16}$	48 $\frac{5}{16}$
E	40 $\frac{1}{8}$	40 $\frac{1}{8}$	42 $\frac{1}{4}$	42 $\frac{1}{4}$
F	10 $\frac{1}{2}$	10 $\frac{1}{2}$	12 $\frac{1}{2}$	12 $\frac{1}{2}$
G	15 $\frac{3}{4}$	15 $\frac{3}{4}$	18 $\frac{3}{4}$	18 $\frac{3}{4}$
H	21	21	25	25
I	14 $\frac{3}{16}$	14 $\frac{3}{16}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$
J	22	22	27 $\frac{1}{2}$	27 $\frac{1}{2}$
K	6 $\frac{1}{2}$ x 10	6 $\frac{1}{2}$ x 10	7 $\frac{1}{4}$ x 12	7 $\frac{1}{4}$ x 12
M	.....	44	.....	46 $\frac{1}{2}$
N	10 $\frac{7}{8}$	10 $\frac{7}{8}$	12 $\frac{1}{4}$	12 $\frac{1}{4}$
P	7	7	9	9
S	20 $\frac{1}{2}$	20 $\frac{1}{2}$	21 $\frac{1}{2}$	21 $\frac{1}{2}$
T	7 $\frac{1}{4}$	7 $\frac{1}{4}$	8 $\frac{1}{4}$	8 $\frac{1}{4}$

	No. 4		No. 5	
	Water	Steam	Water	Steam
A	36	36	48	48
B	62 $\frac{1}{2}$	65 $\frac{15}{16}$	69 $\frac{3}{8}$	72 $\frac{3}{8}$
C*	17 $\frac{1}{2}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$
D	58 $\frac{17}{32}$	58 $\frac{17}{32}$	65 $\frac{13}{32}$	65 $\frac{13}{32}$
E	51	51	57 $\frac{7}{8}$	57 $\frac{7}{8}$
F	14 $\frac{1}{2}$	14 $\frac{1}{2}$	16 $\frac{1}{2}$	16 $\frac{1}{2}$
G	21 $\frac{3}{4}$	21 $\frac{3}{4}$	24 $\frac{3}{4}$	24 $\frac{3}{4}$
H	29	29	33	33
I	18 $\frac{1}{4}$	18 $\frac{1}{4}$	19 $\frac{5}{16}$	19 $\frac{5}{16}$
J	33 $\frac{5}{8}$	33 $\frac{5}{8}$	39 $\frac{3}{4}$	39 $\frac{3}{4}$
K	12 $\frac{1}{4}$ x 13	12 $\frac{1}{4}$ x 13	8 $\frac{3}{4}$ x 15 $\frac{1}{2}$	8 $\frac{3}{4}$ x 15 $\frac{1}{2}$
M	.....	56 $\frac{1}{2}$	.....	62
N	12 $\frac{1}{4}$	12 $\frac{1}{4}$	12 $\frac{1}{4}$	12 $\frac{1}{4}$
P	12	12	12	12
S	26	26	24	24
T	9 $\frac{3}{8}$	9 $\frac{3}{8}$	10 $\frac{1}{4}$	10 $\frac{1}{4}$

Do not bush flow-pipe outlets of Steam Boilers—connect all of them full size to the main (see page 224).

\*When Smoke-Pipe connection is taken from top of head the cover with check damper placed over "P" extends "C" measurement to the following figures: No. 2, 14  $\frac{3}{4}$ ; No. 3, 19  $\frac{5}{8}$ ; Nos. 4 and 5, 20  $\frac{3}{8}$ .

# Ideal Standard Water Boilers



No. 25-3-W Boiler

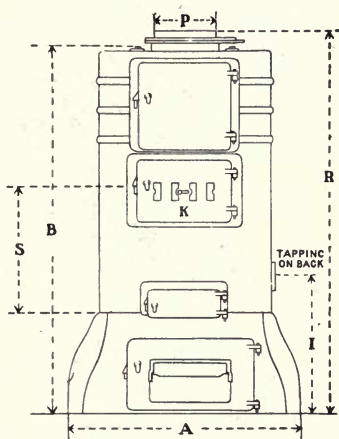
No.	Heights to Top Out- let Inches	Diameter of Base Inches	Diam- eter of Grate Inches	Outlet and Inlet Inches	Smoke Pipe Inches	Ratings (See note)	List Prices
15-1-W	44	27 1/2	15	3	7	400	\$114.00
15-2-W	48	27 1/2	15	3	7	425	123.00
17-3-W	49 1/4	28 3/4	17	3	7	500	140 50
17-4-W	53 1/4	28 3/4	17	3	7	550	153 50
17-5-W	57 1/4	28 3/4	17	3	7	600	164 50
19-3-W	50	30 1/2	19	3	8	750	197 00
19-4-W	54	30 1/2	19	3	8	825	210 50
19-5-W	58	30 1/2	19	3	8	900	224 00
22-3-W	53	35	22	4	9	875	217 50
22-4-W	57 1/2	35	22	4	9	950	230 00
22-5-W	62	35	22	4	9	1025	270 00
25-3-W	54	38	25	4	10	1250	307 00
25-4-W	58 1/2	38	25	4	10	1350	325 00
25-5-W	63	38	25	4	10	1425	340 00
28-3-W	57	41 3/8	28	5	11	1500	350 50
28-4-W	62	41 3/8	28	5	11	1600	372 50
28-5-W	67	41 3/8	28	5	11	1700	389 50
31-3-W	58	44 1/8	31	5	12	1750	398 00
31-4-W	63	44 1/8	31	5	12	1950	431 00
31-5-W	68	44 1/8	31	5	12	2050	448 00
34-3-W	59	48 1/8	34	6	13	2350	501 50
34-4-W	64	48 1/8	34	6	13	2500	530 50
34-5-W	69	48 1/8	34	6	13	2650	555 00

For additional detailed measurements, see page opposite.

For price list of boiler parts, see pages 192 to 210 inclusive.

See Note, page 33.

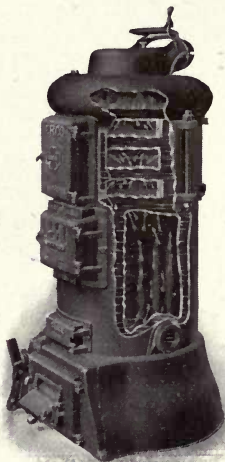
# Standard Water Boiler Measurements



No.	A	B	I	K	P	R	S
15-1-W	27½	44	16	7½ x 10½	7	46½	19½
15-2-W	27½	48	16	7½ x 10½	7	50½	19½
17-3-W	28¾	49¼	15⅞	8⅝ x 11¾	7	51¾	18½ <sup>7</sup> / <sub>16</sub>
17-4-W	28¾	53¼	15⅞	8⅝ x 11¾	7	55¾	18½ <sup>7</sup> / <sub>16</sub>
17-5-W	28¾	57¼	15⅞	8⅝ x 11¾	7	59¾	18½ <sup>7</sup> / <sub>16</sub>
19-3-W	30½	50	15⅞	8⅝ x 11¾	8	52½	18½ <sup>5</sup> / <sub>16</sub>
19-4-W	30½	54	15⅞	8⅝ x 11¾	8	56½	18½ <sup>5</sup> / <sub>16</sub>
19-5-W	30½	58	15⅞	8⅝ x 11¾	8	60½	18½ <sup>5</sup> / <sub>16</sub>
22-3-W	35	53	17	9¼ x 13¼	9	55½	19½
22-4-W	35	57½	17	9¼ x 13¼	9	60	19½
22-5-W	35	62	17	9¼ x 13¼	9	64½	19½
25-3-W	38	54	17½	9¼ x 13¼	10	57	20⅝
25-4-W	38	58½	17½	9¼ x 13¼	10	61½	20⅝
25-5-W	38	63	17½	9¼ x 13¼	10	66	20⅝
28-3-W	41⅜	57	18⅝	9½ x 16	11	60	20⅝
28-4-W	41⅜	62	18⅝	9½ x 16	11	65	20⅝
28-5-W	41⅜	67	18⅝	9½ x 16	11	70	20⅝
31-3-W	44⅞	58	18⅜	9½ x 16	12	61	21⅝
31-4-W	44⅞	63	18⅜	9½ x 16	12	66	21⅝
31-5-W	44⅞	68	18⅜	9½ x 16	12	71	21⅝
34-3-W	48⅞	59	19¼	9½ x 16	13	62	22¼
34-4-W	48⅞	64	19¼	9½ x 16	13	67	22¼
34-5-W	48⅞	69	19¼	9½ x 16	13	72	22¼

# Ideal Arco Round Boilers

(Patented)



**No. 2-22-S Steam Boiler. Hard Coal.**



**No. 2-22-W Water Boiler. Hard Coal**

When soft coal is used for fuel, size larger Boiler should be selected than would be required for hard coal.



# Ideal Arco Round Boilers

## STEAM—HARD COAL

No.	Height (to top outlet) Inches	Diam. at Base Inches	Diam. Pot Inches	Height Water Line Inches	1 Outlet 2 Inlets Inches	Smoke Pipe Inches	Rat- ings (See note)	Price Complete
2-19-S	57	30½	19	50	2½	8	350	\$167 00
3-19-S	61½	30½	19	50¾	2½	8	400	193 00
2-22-S	58¾	35	22	53½	3	9	525	226 00
3-22-S	63¾	35	22	56¾	3	9	575	240 00
2-25-S	61¾	38	25	54¼	3½	9	625	277 50
3-25-S	66¾	38	25	59¼	3½	9	700	300 00
2-28-S	62½	41¾	28	56	4	10	900	360 50
3-28-S	67½	41¾	28	61¾	4	10	1000	389 50
2-31-S	66	44½	31	57¼	4	10	1275	470 00
3-31-S	71¾	44½	31	63¼	4	10	1400	500 00
2-34-S	69	48¾	34	59¾	5	11	1500	530 00
3-34-S	75	48¾	34	65½	5	11	1650	575 00

## STEAM—SOFT COAL

1-19-S	52½	30½	19	45½	2½	8	275	\$140 50
1-22-S	54¾	35	22	49	3	9	400	193 00
1-25-S	56¾	38	25	49¼	3½	9	500	219 50
1-28-S	57¾	41¾	28	50	4	10	800	331 00
1-31-S	60¾	44½	31	52½	4	10	1000	389 50
1-34-S	64	48¾	34	54¾	5	11	1250	462 50

## WATER—HARD COAL

No.	Height (to top outlet) Inches	Diam. at Base Inches	Diam. Pot Inches	Outlets No. and Size	Inlets No. and Size	Smoke Pipe Inches	Rat- ings (See note)	Price Complete
2-19-W	50¾	30½	19	2-2½	2-2½	8	575	\$158 00
3-19-W	54¾	30½	19	2-2½	2-2½	8	650	184 50
2-22-W	52¼	35	22	2-3	2-3	9	875	217 50
3-22-W	57¼	35	22	2-3	2-3	9	950	230 00
2-25-W	55	38	25	2-3½	2-3½	9	1025	270 00
3-25-W	60	38	25	2-3½	2-3½	9	1150	290 00
2-28-W	55½	41¾	28	2-4	2-4	10	1500	350 50
3-28-W	60½	41¾	28	2-4	2-4	10	1650	360 00
2-31-W	59	44½	31	2-4	2-4	10	2100	457 50
3-31-W	64¾	44½	31	2-4	2-4	10	2325	495 00
2-34-W	61¾	48¾	34	2-5	2-5	11	2475	525 00
3-34-W	66¾	48¾	34	2-5	2-5	11	2725	565 00

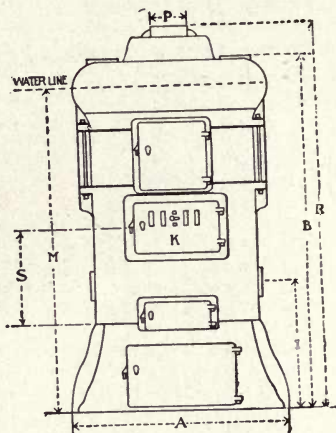
## WATER—SOFT COAL

1-19-W	45¾	30½	19	2-2½	2 2½	8	450	\$131 50
1-22-W	48¼	35	22	2-3	2 3	9	650	184 00
1-25-W	50	38	25	2-3½	2-3½	9	825	210 50
1-28-W	50½	41¾	28	2-4	2-4	10	1325	321 00
1-31-W	54¼	44½	31	2-4	2-4	10	1650	380 00
1-34-W	56¼	48¾	34	2-5	2-5	11	2075	450 00

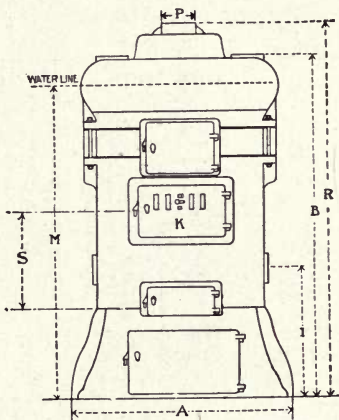
For price list of boiler parts, see pages 192 to 210, inclusive.  
For additional detailed measurements, see pages 20 and 21.

*See Note, page 33.*

# Ideal Arco Measurements



For Hard Coal.



For Soft Coal.

(Above outlines do not represent the Water Boiler—the outlines are of Steam Boilers used to show measurements of both types.)

For details of measurements see page opposite.

# Ideal Arco Measurements—Continued

Table of distances between points as outlined on skeleton sketch of Boilers shown on opposite page.

These measurements are given in inches.

## STEAM

No.	A	B	I	K	M	P	R	S
1-19-S	30½	52¼	14¾	8½ x 11¾	45½	8	59¾	15¾
2-19-S	30½	57	14¾	8½ x 11¾	50	8	64¼	15¾
3-19-S	30½	61½	14¾	8½ x 11¾	54½	8	68¾	15¾
1-22-S	35	54¾	16¼	9 x 13¼	49	9	62¾	16
2-22-S	35	58¾	16¼	9 x 13¼	53½	9	67	16
3-22-S	35	63¾	16¼	9 x 13¼	56¾	9	71¼	16
1-25-S	38	56¾	17½	9 x 13¼	49¼	9	65¼	16
2-25-S	38	61¾	17½	9 x 13¼	54¼	9	70¼	16
3-25-S	38	66¾	17½	9 x 13¼	57¼	9	75¼	16
1-28-S	41⅜	57¾	17¾	9⅝ x 18	50	10	66	18
2-28-S	41⅜	62½	17¾	9⅝ x 18	56	10	70¼	18
3-28-S	41⅜	67⅞	17¾	9⅝ x 18	61¾	10	75¼	18
1-31-S	44⅞	60¾	18	9⅝ x 18	52½	10	69½	19½
2-31-S	44⅞	66	18	9⅝ x 18	57¼	10	76	19½
3-31-S	44⅞	71⅞	18	9⅝ x 18	63¼	10	81¼	19½
1-34-S	48⅞	64	19	9⅝ x 18	54¾	11	73¼	20
2-34-S	48⅞	69	19	9⅝ x 18	59¾	11	77½	20
3-34-S	48⅞	75	19	9⅝ x 18	65½	11	84¼	20

## WATER

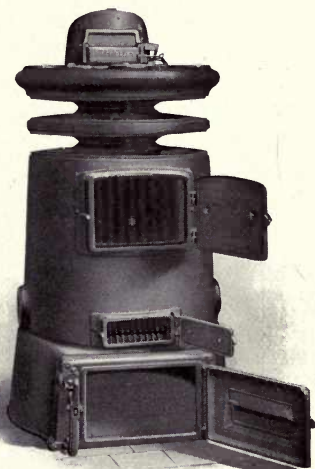
No.	A	B	I	K	P	R	S
1-19-W	30½	45⅞	14¾	8½ x 11¾	8	53⅞	15¾
2-19-W	30½	50¾	14¾	8½ x 11¾	8	57⅝	15¾
3-19-W	30½	54⅞	14¾	8½ x 11¾	8	62½	15¾
1-22-W	35	48¼	16¼	9 x 13¼	9	56¼	16
2-22-W	35	52¼	16¼	9 x 13¼	9	60½	16
3-22-W	35	57¼	16¼	9 x 13¼	9	64¾	16
1-25-W	38	50	17½	9 x 13¼	9	58½	16
2-25-W	38	55	17½	9 x 13¼	9	63½	16
3-25-W	38	60	17½	9 x 13¼	9	68½	16
1-28-W	41⅜	50½	17¾	9⅝ x 18	10	59	18
2-28-W	41⅜	55½	17¾	9⅝ x 18	10	63¼	18
3-28-W	41⅜	60½	17¾	9⅝ x 18	10	68¼	18
1-31-W	44⅞	54¼	18	9⅝ x 18	10	62¾	19½
2-31-W	44⅞	59	18	9⅝ x 18	10	67⅝	19½
3-31-W	44⅞	64¾	18	9⅝ x 18	10	74⅞	19½
1-34-W	48⅞	56¼	19	9⅝ x 18	11	64⅝	20
2-34-W	48⅞	61⅝	19	9⅝ x 18	11	70⅞	20
3-34-W	48⅞	66⅝	19	9⅝ x 18	11	75⅞	20

See page 24 for distances between centers of outlets and inlets.

# Ideal Premier Round Boilers



No. 2024 Steam Boiler



Open View—No. 2124 Water Boiler

When soft coal is used for fuel a size larger Boiler should be selected than would be required for hard coal.

# Ideal Premier Round Boilers

## STEAM BOILERS

No.	H'g't to Top Outl't Inch's	Diam- eter Inch's	Diam- eter Pot Inch's	H'g't Water Line Inch's	O'tl'ts and Inlets Size Inch's	Sm'ke Pipe Inch's	Ratings (See Note)	Price Complete
1015	45	24	15	40½	2	7	175	\$ 105.50
2015	49	24	15	44½	2	7	200	114.00
3015	53	24	15	48½	2	7	225	123.00
1018	47½	27	18	43¼	2½	7	275	140.50
2018	52	27	18	47½	2½	7	300	149.50
3018	56½	27	18	51¾	2½	7	325	158.00
1021	50	30	21	44½	3	9	400	193.00
2021	54	30	21	49	3	9	425	199.50
3021	58	30	21	53½	3	9	450	206.50
4021	62½	30	21	58½	3	9	475	213.00
1024	51	33	24	45½	3½	9	525	226.00
2024	55½	33	24	50¼	3½	9	575	240.00
3024	60	33	24	55	3½	9	625	277.50
4024	64½	33	24	59½	3½	9	650	287.50
1027	51½	36½	27	46¾	3½	10	750	317.00
2027	56½	36½	27	51½	3½	10	800	331.00
3027	61¾	36½	27	56¼	3½	10	850	346.00
4027	66½	36½	27	61½	3½	10	900	360.50

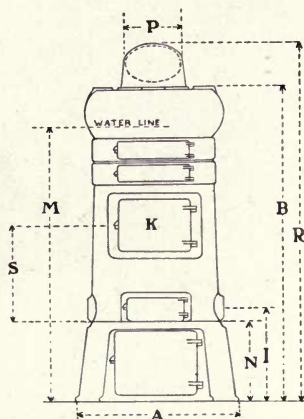
## WATER BOILERS

No.	Height to Top Outlet Inches	Diam- eter Inch's	Diam- eter Pot Inch's	Outlets and Inlets Size Inches	Smoke- Pipe Inches	Ratings (See Note)	Price Complete
1115	40	24	15	2	7	300	\$ 88.00
2115	44	24	15	2	7	325	96.50
3115	48	24	15	2	7	350	101.00
1118	42½	27	18	2½	7	450	131.50
2118	47	27	18	2½	7	500	140.50
3118	51½	27	18	2½	7	550	153.50
1121	44	30	21	3	9	600	164.50
2121	48½	30	21	3	9	650	184.00
3121	53	30	21	3	9	700	191.00
4121	57½	30	21	3	9	750	197.00
1124	45	33	24	3½	9	875	217.50
2124	50	33	24	3½	9	950	230.00
3124	55	33	24	3½	9	1025	270.00
4124	59½	33	24	3½	9	1075	277.50
1127	46	36½	27	3½	10	1250	307.00
2127	50½	36½	27	3½	10	1325	321.00
3127	55¾	36½	27	3½	10	1400	336.00
4127	60½	36½	27	3½	10	1475	350.50

For price list of boiler parts see pages 192 to 210 inclusive.

See note, page 33.

# Premier Boiler Measurements



(Above outline represents Steam Boilers—outlines of which are used to show measurements of both types.)

For details of measurements, see page 25.

## Tapping Data on Ideal Water Boilers

To enable fitters to cut their piping at their shops we herewith publish a table giving the distances between the centers of outlets on top of the Boiler, and between the faces of the bosses in which the inlets are tapped on each side of the boiler.

Arco Boilers			Premier Boilers		
Grate, Inches	Between Centers of Outlets, Inches	Between Return Inlets, Inches *	Grate, Inches	Between Centers of Outlets, Inches	Between Return Inlets, Inches *
19	19 $\frac{1}{4}$	24 $\frac{1}{8}$	15	13 $\frac{1}{8}$	19 $\frac{27}{32}$
22	23	27 $\frac{1}{2}$	18	16 $\frac{1}{8}$	22 $\frac{1}{8}$
25	25 $\frac{1}{4}$	30 $\frac{1}{8}$	21	17 $\frac{1}{8}$	25 $\frac{1}{8}$
28	28 $\frac{3}{8}$	34 $\frac{1}{16}$	24	20 $\frac{5}{16}$	28 $\frac{3}{4}$
31	32 $\frac{3}{8}$	36 $\frac{3}{8}$	27	22 $\frac{1}{8}$	32 $\frac{3}{4}$
34	36 $\frac{9}{16}$	39 $\frac{7}{32}$			
Junior Boilers			NOTE		
15	17 $\frac{1}{4}$	20 $\frac{9}{16}$	* This distance between return tap- pings applies also on Steam Boilers.		
18	17 $\frac{3}{4}$	23 $\frac{3}{8}$			

The distance between return inlets of both Steam and Water Sectional Boilers is: 15-inch grate, 25 $\frac{1}{8}$  inches; 22-inch grate, 33 $\frac{7}{8}$  inches; 28-inch grate, 41 $\frac{1}{8}$  inches; 36-inch grate, 52 $\frac{5}{8}$  inches; 48-inch grate, 64 $\frac{1}{8}$  inches.



# Premier Boiler Measurements—Continued

Table of distances between points outlined on skeleton sketch of Boilers shown on opposite page. These measurements are given in inches.

## STEAM

No.	A	B	I	K	M	P	*R	S
1015	24	45 $\frac{1}{4}$	15 $\frac{1}{8}$	8 x10 $\frac{1}{2}$	39 $\frac{3}{4}$	7	52	15 $\frac{3}{4}$
2015	24	49 $\frac{1}{4}$	15 $\frac{1}{8}$	8 x10 $\frac{1}{2}$	43 $\frac{3}{4}$	7	56	15 $\frac{3}{4}$
3015	24	53 $\frac{1}{4}$	15 $\frac{1}{8}$	8 x10 $\frac{1}{2}$	47 $\frac{3}{4}$	7	60	15 $\frac{3}{4}$
1018	27	47 $\frac{3}{4}$	15 $\frac{3}{8}$	9 x11 $\frac{5}{8}$	41 $\frac{3}{4}$	7	54 $\frac{1}{2}$	17 $\frac{3}{4}$
2018	27	52	15 $\frac{3}{8}$	9 x11 $\frac{5}{8}$	46	7	58 $\frac{3}{4}$	17 $\frac{3}{4}$
3018	27	56 $\frac{1}{4}$	15 $\frac{3}{8}$	9 x11 $\frac{5}{8}$	50 $\frac{1}{4}$	7	63	17 $\frac{3}{4}$
1021	30 $\frac{1}{8}$	49 $\frac{1}{4}$	15 $\frac{7}{8}$	10 $\frac{1}{8}$ x13 $\frac{1}{4}$	43	9	57 $\frac{1}{4}$	18 $\frac{1}{16}$
2021	30 $\frac{1}{8}$	53 $\frac{3}{4}$	15 $\frac{7}{8}$	10 $\frac{1}{8}$ x13 $\frac{1}{4}$	47 $\frac{1}{2}$	9	61 $\frac{3}{4}$	18 $\frac{1}{16}$
3021	30 $\frac{1}{8}$	58 $\frac{1}{4}$	15 $\frac{7}{8}$	10 $\frac{1}{8}$ x13 $\frac{1}{4}$	52	9	66 $\frac{1}{4}$	18 $\frac{1}{16}$
4021	30 $\frac{1}{8}$	62 $\frac{9}{16}$	15 $\frac{7}{8}$	10 $\frac{1}{8}$ x13 $\frac{1}{4}$	58 $\frac{1}{8}$	9	71 $\frac{3}{16}$	18 $\frac{1}{16}$
1024	33 $\frac{1}{8}$	50 $\frac{3}{4}$	16 $\frac{1}{8}$	10 $\frac{1}{8}$ x13 $\frac{1}{4}$	44	9	58 $\frac{3}{4}$	18 $\frac{1}{16}$
2024	33 $\frac{1}{8}$	55 $\frac{1}{2}$	16 $\frac{1}{8}$	10 $\frac{1}{8}$ x13 $\frac{1}{4}$	48 $\frac{3}{4}$	9	63 $\frac{1}{2}$	18 $\frac{1}{16}$
3024	33 $\frac{1}{8}$	60 $\frac{1}{4}$	16 $\frac{1}{8}$	10 $\frac{1}{8}$ x13 $\frac{1}{4}$	53 $\frac{1}{2}$	9	68 $\frac{1}{4}$	18 $\frac{1}{16}$
4024	33 $\frac{1}{8}$	65	16 $\frac{1}{8}$	10 $\frac{1}{8}$ x13 $\frac{1}{4}$	58 $\frac{1}{4}$	9	73 $\frac{7}{16}$	18 $\frac{1}{16}$
1027	34	51 $\frac{1}{2}$	16 $\frac{3}{8}$	9 x15	46 $\frac{3}{8}$	10	62 $\frac{1}{2}$	18 $\frac{3}{8}$
2027	34	56 $\frac{7}{16}$	16 $\frac{3}{8}$	9 x15	51 $\frac{5}{16}$	10	67 $\frac{7}{16}$	18 $\frac{3}{8}$
3027	34	61 $\frac{3}{8}$	16 $\frac{3}{8}$	9 x15	56 $\frac{1}{4}$	10	72 $\frac{3}{8}$	18 $\frac{3}{8}$
4027	34	66 $\frac{5}{16}$	16 $\frac{3}{8}$	9 x15	61 $\frac{3}{16}$	10	77 $\frac{5}{16}$	18 $\frac{3}{8}$

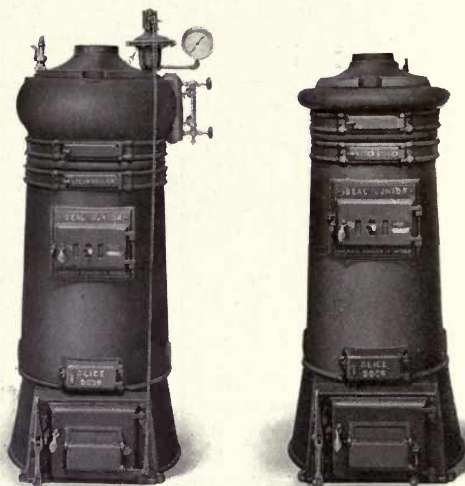
## WATER

No.	A	B	I	K	P	*R	S
1115	24	40 $\frac{1}{2}$	15 $\frac{1}{8}$	8 x10 $\frac{1}{2}$	7	47 $\frac{1}{4}$	15 $\frac{3}{4}$
2115	24	44 $\frac{1}{2}$	15 $\frac{1}{8}$	8 x10 $\frac{1}{2}$	7	51 $\frac{1}{4}$	15 $\frac{3}{4}$
3115	24	48 $\frac{1}{2}$	15 $\frac{1}{8}$	8 x10 $\frac{1}{2}$	7	55 $\frac{1}{4}$	15 $\frac{3}{4}$
1118	27	42 $\frac{3}{4}$	15 $\frac{3}{8}$	9 x11 $\frac{5}{8}$	7	49 $\frac{1}{2}$	17 $\frac{3}{4}$
2118	27	47	15 $\frac{3}{8}$	9 x11 $\frac{5}{8}$	7	53 $\frac{3}{4}$	17 $\frac{3}{4}$
3118	27	51 $\frac{1}{4}$	15 $\frac{3}{8}$	9 x11 $\frac{5}{8}$	7	58	17 $\frac{3}{4}$
1121	30 $\frac{1}{8}$	44	15 $\frac{7}{8}$	10 $\frac{1}{8}$ x13 $\frac{1}{4}$	9	52	18 $\frac{1}{16}$
2121	30 $\frac{1}{8}$	48 $\frac{1}{2}$	15 $\frac{7}{8}$	10 $\frac{1}{8}$ x13 $\frac{1}{4}$	9	56 $\frac{1}{2}$	18 $\frac{1}{16}$
3121	30 $\frac{1}{8}$	53	15 $\frac{7}{8}$	10 $\frac{1}{8}$ x13 $\frac{1}{4}$	9	61	18 $\frac{1}{16}$
4121	30 $\frac{1}{8}$	57 $\frac{5}{16}$	15 $\frac{7}{8}$	10 $\frac{1}{8}$ x13 $\frac{1}{4}$	9	65 $\frac{1}{16}$	18 $\frac{1}{16}$
1124	33 $\frac{1}{8}$	45 $\frac{1}{4}$	16 $\frac{1}{8}$	10 $\frac{1}{8}$ x13 $\frac{1}{4}$	9	53 $\frac{1}{4}$	18 $\frac{1}{16}$
2124	33 $\frac{1}{8}$	50	16 $\frac{1}{8}$	10 $\frac{1}{8}$ x13 $\frac{1}{4}$	9	58	18 $\frac{1}{16}$
3124	33 $\frac{1}{8}$	54 $\frac{3}{4}$	16 $\frac{1}{8}$	10 $\frac{1}{8}$ x13 $\frac{1}{4}$	9	62 $\frac{3}{4}$	18 $\frac{1}{16}$
4124	33 $\frac{1}{8}$	59 $\frac{5}{16}$	16 $\frac{1}{8}$	10 $\frac{1}{8}$ x13 $\frac{1}{4}$	9	67 $\frac{1}{16}$	18 $\frac{1}{16}$
1127	32 $\frac{1}{2}$	46	16 $\frac{3}{8}$	9 x15	10	57	18 $\frac{3}{8}$
2127	32 $\frac{1}{2}$	50 $\frac{1}{16}$	16 $\frac{3}{8}$	9 x15	10	61 $\frac{1}{16}$	18 $\frac{3}{8}$
3127	32 $\frac{1}{2}$	55 $\frac{7}{8}$	16 $\frac{3}{8}$	9 x15	10	66 $\frac{7}{8}$	18 $\frac{3}{8}$
4127	32 $\frac{1}{2}$	60 $\frac{1}{16}$	16 $\frac{3}{8}$	9 x15	10	71 $\frac{1}{16}$	18 $\frac{3}{8}$

\* NOTE—When smoke-pipe is reversed add 1 $\frac{1}{4}$  inches to the 15-inch and 18-inch and 1 $\frac{3}{8}$  inches to the 21-inch and 24-inch measurements.

See page 24 for distances between centers of outlets and inlets.

# Ideal Junior Boilers



## STEAM

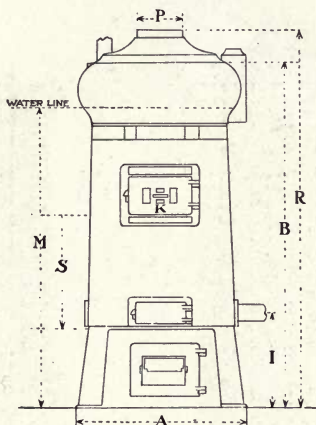
No.	Height (to Top Outlet) Inches	Diam. Inches	Diam. Grate Inches	Height Water Line Inches	Outlets No. and Size	Inlets No. and Size	Kat- ings (See Note)	Price Com- plete
1500	53 $\frac{3}{4}$	25 $\frac{3}{4}$	15	48 $\frac{1}{4}$	1-2	2-2	300	\$149.50
1600	57 $\frac{3}{4}$	25 $\frac{3}{4}$	15	52 $\frac{1}{4}$	1-2	2-2	340	163.00
1800	54 $\frac{1}{2}$	27	18	48 $\frac{3}{8}$	1-2 $\frac{1}{2}$	2-2	525	226.00
1900	58 $\frac{1}{2}$	27	18	52 $\frac{3}{8}$	1-2 $\frac{1}{2}$	2-2	575	240.00

## WATER

1501	48 $\frac{1}{2}$	25 $\frac{3}{4}$	15	.....	2-2	2-2	500	\$140.50
1601	52 $\frac{1}{2}$	25 $\frac{3}{4}$	15	.....	2-2	2-2	600	164.50
1801	49	27	18	.....	2-2	2-2	875	217.50
1901	53	27	18	.....	2-2	2-2	900	224.00

*See note, page 33.*

# Junior Boiler Measurements



## STEAM

No.	A	B	I	K	M	P	R	S
1500	25 $\frac{3}{4}$	53 $\frac{3}{4}$	15 $\frac{1}{4}$	6 $\frac{3}{4}$ x 10 $\frac{9}{16}$	48 $\frac{1}{4}$	6	58 $\frac{3}{4}$	20
1600	25 $\frac{3}{4}$	57 $\frac{3}{4}$	15 $\frac{1}{4}$	6 $\frac{3}{4}$ x 10 $\frac{9}{16}$	52 $\frac{1}{4}$	6	62 $\frac{3}{4}$	20
1800	27	54 $\frac{1}{2}$	15 $\frac{1}{4}$	6 $\frac{3}{4}$ x 10 $\frac{9}{16}$	48 $\frac{3}{8}$	7	59 $\frac{3}{4}$	19 $\frac{1}{2}$
1900	27	58 $\frac{1}{2}$	15 $\frac{1}{4}$	6 $\frac{3}{4}$ x 10 $\frac{9}{16}$	52 $\frac{3}{8}$	7	63 $\frac{3}{4}$	19 $\frac{1}{2}$

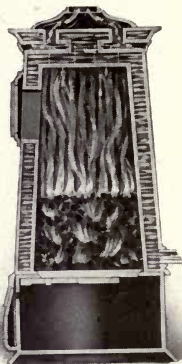
## WATER

No.	A	B	I	K	P	R	S
1501	25 $\frac{3}{4}$	48 $\frac{1}{2}$	15 $\frac{1}{4}$	6 $\frac{3}{4}$ x 10 $\frac{9}{16}$	6	53 $\frac{1}{2}$	20
1601	25 $\frac{3}{4}$	52 $\frac{1}{2}$	15 $\frac{1}{4}$	6 $\frac{3}{4}$ x 10 $\frac{9}{16}$	6	57 $\frac{1}{2}$	20
1801	27	49	15 $\frac{1}{4}$	6 $\frac{3}{4}$ x 10 $\frac{9}{16}$	7	54 $\frac{1}{4}$	19 $\frac{1}{2}$
1901	27	53	15 $\frac{1}{4}$	6 $\frac{3}{4}$ x 10 $\frac{9}{16}$	7	58 $\frac{1}{4}$	19 $\frac{1}{2}$

# Ideal Water Heaters



No. 152 Ideal Premier



No. 10 Ideal Junior



No. 10 Ideal Arco



No. I-C Ideal Laundry

See pages 230 to 238 for special temperature ratings.

# Ideal Water Heaters

## Data and List Prices

Style	No.	Diam- eter Grate Inches	Outlets Inches	*Capac- ity Gallons	Price Complete
† IDEAL Premier	101	10 ¼	1-1 ½	140	\$ 37.00
“ “	121	12	3-1 ½	210	65.00
“ “	122	12	3-1 ½	230	77.00
“ “	151	15	3-2	335	89.00
“ “	152	15	3-2	375	106.00
“ “	181	18	3-2	600	118.00
“ “	182	18	3-2	660	138.00
†† IDEAL Junior	0	10	1-1 ½	90	34.00
“ “	10	12	3-1 ½	190	57.00
“ “	12	12	3-1 ½	210	73.00
“ “	20	15	3-2	380	83.00
“ “	22	15	3-2	425	102.00
“ “	30	18	3-2	600	114.00
“ “	32	18	3-2	660	142.00
IDEAL Arco	10"	10	1-1 ½	80	33.00
“ “	12"	12	1-1 ½	145	37.00
“ “	15"	15	1-1 ½	240	50.00
IDEAL Laundry	1-C	10	1-1	100	31.00

\* Actual practice has demonstrated that a heater which will raise the water from 25 to 30 degrees per hour in the storage tank is sufficiently large for the ordinary residence. The above ratings are based on raising the quantity of water stated in gallons 25 degrees Fahrenheit per hour for eight consecutive hours on one full charge of hard coal as fuel. In apartment buildings, barber shops, etc., where the demand is proportionately heavier, larger heater capacity must be provided.

*See pages 230 to 238 for special temperature ratings.*

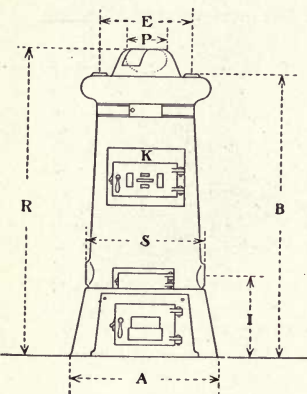
† Nos. 0 and 101 are not provided with butterfly doors. No. 101 can be so equipped if so ordered. None of these Heaters have an intermediate section.

†† Nos. 0 to 12 have slide center grates; Nos. 20 to 32 have rocking grates.

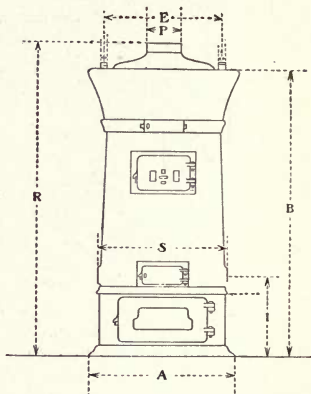
No fire tools are supplied with IDEAL Water Heaters.

For price list of boiler parts see pages 192 to 210 inclusive.

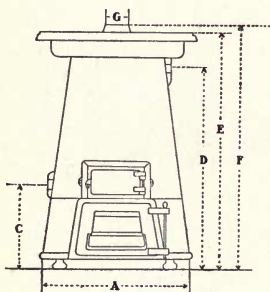
## Ideal Water-Heater Dimensions



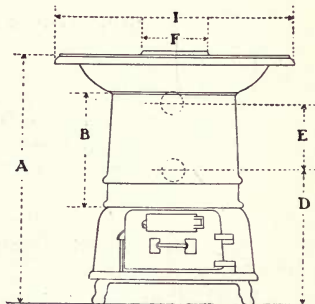
### Ideal Premier Junior



## Ideal Junior



## Ideal Arco



## Ideal Laundry

See page 230 to 238 for special temperature ratings.



# Ideal Water-Heater Dimensions

Continued

## Ideal Junior Water Heaters

No.	R	A	P	B	S	I	E
0	34 1/2	18	5	31	.....	14 1/2	.....
10	39	20 1/4	5	35	18 1/8	13 1/4	12
12	43 1/8	20 1/4	5	39 1/8	18 1/8	13 1/4	12
20	47 7/8	22 7/8	6	42 1/8	20 3/4	14 1/2	14 7/8
22	51 7/8	22 7/8	6	46 1/8	20 3/4	14 1/2	14 7/8
30	47 7/8	26 1/4	7	42 3/4	24 3/4	15 1/4	18 1/4
32	51 7/8	26 1/4	7	46 3/4	24 3/4	15 1/4	18

## Ideal Premier Junior Water Heaters

No.	A	B	E	I	P	R	S
101	18	29 5/8	.....	9 1/4	5	33 1/8	.....
121	24	37 1/4	12	13 7/8	6	41 1/2	18 1/4
122	24	42 1/2	14 3/4	13 7/8	6	46 3/4	18 1/4
151	25 3/4	42 5/8	14 3/4	15 1/8	6	47 5/8	20 5/8
152	25 3/4	47 7/8	17 1/4	15 1/8	7	53 5/8	20 5/8
181	27	44 3/4	18 1/4	15 1/8	7	50	24 1/4
182	27	50 1/4	17 3/4	15 1/8	7	56 7/8	24 1/4

## Ideal Arco Water Heaters

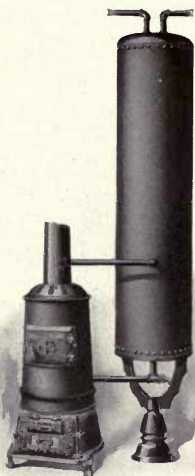
No.	A	C	D	E	F	G
10	16	9 5/8	21 1/2	26 3/4	27 1/2	5
12	19 1/2	9 7/8	22 3/8	27 1/2	28 1/4	5
15	21	10 3/8	24 1/2	30 1/4	31	6

## Ideal Laundry Water Heater No. 1-C

No.	A	B	I	F	D	E
1-C	27	12 3/8	27 1/2	6	14 1/2	7 7/16

See pages 230 to 238 for special temperature ratings.

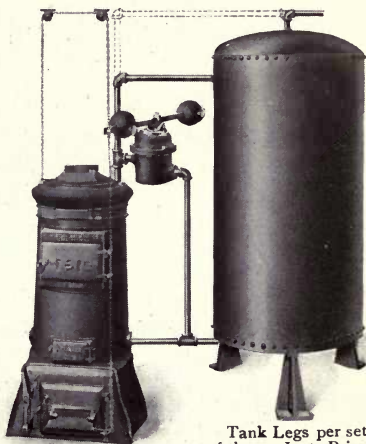
# Heaters and Storage Tanks



This view shows a No. 0 IDEAL Water Heater connected to a kitchen range Boiler.

IDEAL Water Heaters are also used very economically to warm small cottages or parts of homes, offices, livery stables, barns, small stores, railroad switch towers, and small stations, commission storage rooms, etc. For prices, see page 29.

IDEAL Premier Junior Water Heater connected to Vertical Tank and a Sylphon Damper Regulator for controlling the temperature of the water (see pages 161 and 162). Dotted lines show other methods of connection—top piping outlines show a method of getting extra-quick hot faucet supply. See pages 29 and 136 to 139.



Tank Legs per set of three, List Price \$3.00. 7 $\frac{3}{4}$  inches floor to Tank; 8 $\frac{1}{4}$  inches over all.

## Note on Ratings, Etc.

**Ratings.** The ratings for IDEAL Boilers provide that all piping (mains and risers, flow and return), in addition to the direct radiation to be used, shall be figured as radiating surface in estimating the size of the Boiler required.

When a pipe-coil or cast-iron section is introduced into the firepot for the purpose of heating water for domestic use, additional capacity should be figured in determining size of Boiler, viz., in the case of Steam Boilers,  $1\frac{1}{4}$  square feet of direct radiation for each gallon of water to be thus heated, and in the case of Water Boilers, 2 square feet of direct radiation for each gallon of water to be thus heated, according to the capacity of the tank to which coil or section is connected.

These ratings are for direct radiation. When any other heating surface than direct radiation is to be supplied, increased Boiler capacity must be figured according to the demand in each case.

Ratings are based on hard coal. For soft coal the size of Boiler must depend on the quality of the fuel, with reference to heat-making value. Caking coals have a higher calorific power than the non-caking.

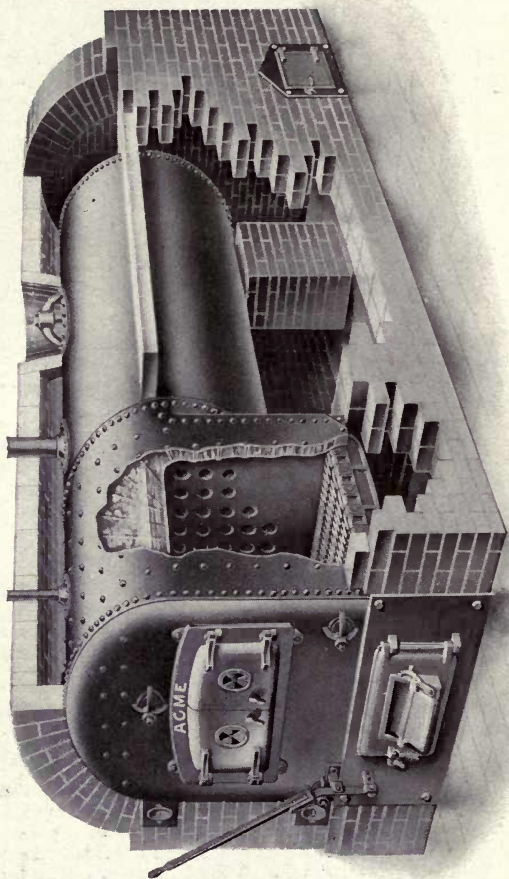
In rating Steam Boilers as above, it is understood that an average pressure of 2 lbs. will be maintained at the Boiler. In rating Water Boilers as above, it is understood that the mean temperature of the water at the Boiler will be 180 degrees Fahrenheit.

**Guarantee.** These Boilers are guaranteed only to the extent of furnishing new castings for any found defective in manufacture. They are conservatively rated according to our own scientific standards, but on account of the varying conditions surrounding their installation, we do not guarantee our Boilers except as above.

**Recommendations.** Both on account of increased efficiency and in the interest of greater economy, we strongly recommend that all Boilers be thoroughly protected by a substantial covering of asbestos.

On page 135 tables will be found giving the amount of Plastic Asbestos required to cover each size of the various styles of IDEAL Boilers. A price list of Molded Asbestos and Wool Felt Coverings for mains and risers will be found on pages 133 and 134.

# Acme Fire Box Boilers



Showing Brick Setting

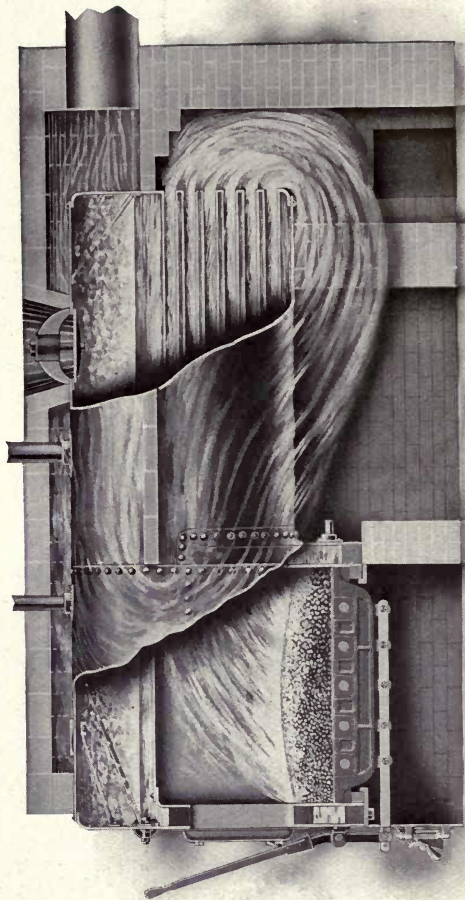
# Acme Fire Box Boilers

For Brick Setting. Without Domes. Manholes in all Boilers over 30 inches Diameter.

NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Diameter of Shell.....in.	30	30	30	36	36	36	42	42	42	48	48	.48	54	54	60	60	66	66	72	72
Length over all .....ft.	6½	7½	8½	7½	9	10½	8½	10	11½	10½	12	13½	14	16½	15½	18	16	18	16	18
Length of Fire Box ....in.	26	32	38	32	38	44	38	44	50	44	50	56	56	62	62	68	62	68	68	74
Width of Fire Box .....in.	24	24	24	30	30	30	36	36	36	42	42	42	48	48	54	54	60	60	66	66
Fire Doors { *Single .....in.	12 x 18	12 x 18	12 x 18	16 x 22	16 x 22	16 x 22	16 x 24	16 x 24	16 x 24	18 x 30	18 x 30	18 x 30	18 x 30	18 x 30	18 x 24	18 x 24	18 x 24	18 x 24	18 x 24	18 x 24
Double .....in.	.....	.....	.....	16 x 22	16 x 22	16 x 22	16 x 24	16 x 24	16 x 24	18 x 30	18 x 30	18 x 30	18 x 30	18 x 30	.....	.....	.....	.....	.....	.....
Approximate weight of Boiler complete with castings.....lb.	2450	2750	3150	3600	3925	4350	4625	5250	5800	7200	7625	8175	9650	10550	13600	15000	16300	17800	19700	21200
Steam { Steam Outlet .	3	3	4	4	4	4	6	6	6	6	6	7	7	7	7	7	8	8	8	8
Tapping { Return Outlet .	2½	2½	3	3	3	3	4	4	4	4	4	5	5	5	5	5	6	6	6	6
Water Tapping—Flow and Return, 2 each.....	4	4	4	5	5	5	5	6	6	6	6	7	7	7	7	8	8	10	10	10
Size of Smoke-Pipe.....in.	16	16	16	18	18	18	20	20	20	22	22	22	24	24	30	30	34	34	40	40
Rating Steam.....sq. ft.	900	1000	1200	1400	1700	2100	2200	2500	2900	3200	3800	4400	4900	5800	7200	8500	9300	10500	11200	12800
Rating Water.....sq. ft.	1400	1600	1900	2200	2700	3400	3500	4000	4600	5100	6100	7000	7800	9300	11500	13600	14800	16800	17900	20500
Price Steam Boiler complete with castings—no trimmings.....	\$285.00	300.00	320.00	375.00	400.00	435.00	460.00	510.00	560.00	630.00	680.00	735.00	860.00	935.00	1200.00	1310.00	1500.00	1600.00	1800.00	2000.00
Steam Trimmings, extra...	\$18.00	18.00	19.00	19.00	19.00	19.00	23.00	23.00	23.00	23.00	23.00	28.00	28.00	28.00	40.00	40.00	40.00	40.00	44.00	44.00
Price Water Boiler with castings—no trimmings.	\$295.00	310.00	330.00	390.00	415.00	450.00	475.00	525.00	575.00	645.00	695.00	755.00	880.00	955.00	1225.00	1335.00	1530.00	1630.00	1840.00	2040.00

No extra charge made for hoe and poker shipped with boiler. Tubes inserted in fire box for domestic coil will be charged extra, \$2 00 net.  
 Boilers No. 15 to 20 have two single fire-doors. Extra charge is made for furnishing coil openings in fire-box.

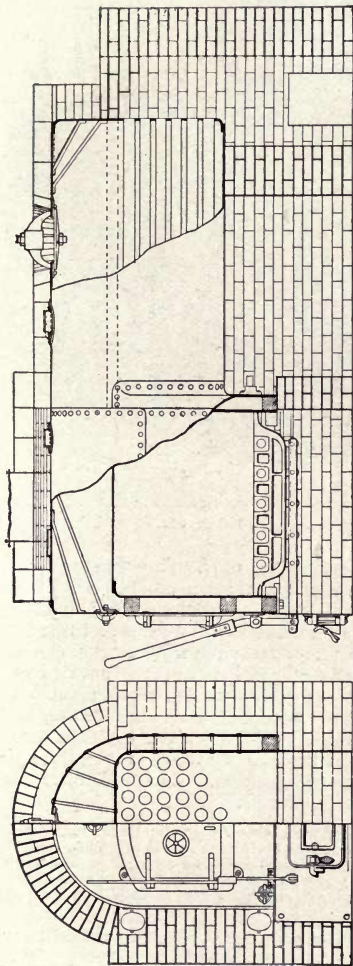
## Acme Fire Box Boilers



Showing Smoke Travel



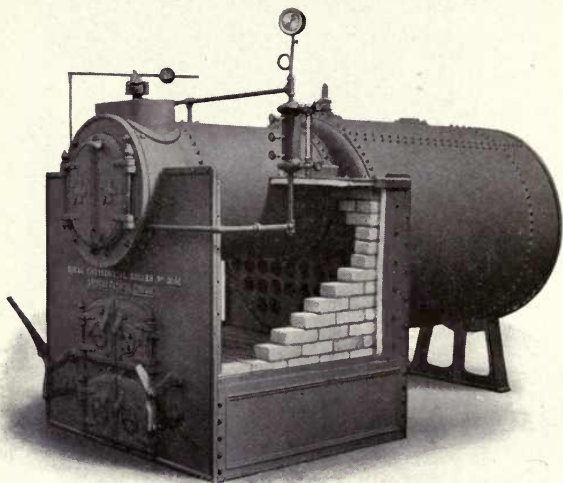
# Brick-Setting Plan For Acme Fire-Box Boilers



Number.....	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Extreme Height of Brick-work .....	65"	57"	65"	72"	72"	72"	79"	79"	79"	77"	85"	85"	93"	93"	105"	105"	110"	110"	118"	118"
Height to Top of Boiler .....	57"	57"	57"	64"	64"	64"	71"	71"	71"	77"	77"	77"	85"	85"	93"	93"	98"	98"	106"	106"
Height of Water Line .....	51"	51"	51"	58"	58"	58"	61"	61"	61"	66"	66"	66"	68"	68"	73"	73"	79"	79"	86"	86"
Height of Ash-Pit Front .....	17"	17"	17"	17"	17"	17"	17"	17"	17"	17"	14"	17"	17"	17"	17"	17"	17"	17"	17"	17"
Extreme Length of Brick-work .....	8'8"	9'8"	10'8"	9'8"	11'2"	12'8"	10'8"	12'2"	13'8"	13'4"	14'10"	16'4"	16'10"	19'4"	18'6"	21'	19'	21'	19'	21'
Extreme Width of Brick-work .....	54"	54"	54"	60"	60"	60"	66"	66"	66"	80"	80"	80"	86"	86"	92"	92"	98"	98"	104"	104"

TRIMMINGS—as listed, include: one Steam Gauge, one Water Column with three Gauge Cocks and Water Gauge; one Pop Safety Valve; one Automatic Draft Regulator. One Hoe and one Poker furnished with each Boiler.  
 Every Boiler fitted with a Safety Fusible Plug in Crown Sheet. Ash Pit Front provided with Special Lift Door for Automatic Regulator.  
 Castings consist of Ash Pit Front, Fire Door and Frame, one large and four small Soot Doors and Frames, and Acme Shaking Grates.

# Ideal Cylindrical Steel Boilers



With part of jacket and fire bricking removed to show fire-box construction, tubes, etc.

For Low-Pressure heating only. Constructed of best materials obtainable; strength, thickness, and form of plates carefully determined; all plates sheared, punched, and flanged to standard forms and templates. Flanges are turned to a radius of not less than 2 inches—free from cracks, checks, or flaws. All machine-riveted, and plates are beveled before joining. Tubes of best lap-welded American manufacture; tube holes slightly counterbored, expanded, and beaded in neat and workmanlike manner. All flat surfaces of heads well supported by stay rods and braces. Castings best quality; grates of improved pattern, rocking action. Each Boiler thoroughly steam- and water-tested before shipment.

The trimmings furnished are: One Automatic Regulator with lever, two weights, two pulleys and jack chain; one Pop Safety Valve; one Steam Gauge; one Drain Cock (but without piping between gauge and trap); one Water Column, tapped top and bottom for one-inch water connections and equipped with water gauge, glass and rods, and three  $\frac{3}{8}$ -inch compression gauge cocks.

The Ash-pit is provided on one side with a special Lift Door for attaching by chain to Automatic Regulator. When boilers are ordered for water, additional return tubes are placed in the shell, but no water-boiler trimmings are furnished. Sketch of water tappings desired should accompany order. List price of water boilers same as steam.

# Ideal Cylindrical Steel Boilers for Low Pressure Heating

No. of Boiler.....	1200	1500	1800	2200	2600	3000	3600	4500
Diameter of Shell . . . . . inches	48	48	48	54	54	54	54	54
Length over all . . . . . feet	8 <sup>2</sup> / <sub>3</sub>	9 <sup>2</sup> / <sub>3</sub>	10 <sup>2</sup> / <sub>3</sub>	9 <sup>2</sup> / <sub>3</sub>	10 <sup>2</sup> / <sub>3</sub>	12 <sup>2</sup> / <sub>3</sub>	14 <sup>1</sup> / <sub>2</sub>	16 <sup>2</sup> / <sub>3</sub>
Height over all . . . . . inches	67	67	67	73	73	73	73	73
Length of Fire Box . . . . . "	30	30	30	36	36	42	48	54
Width of Fire Box . . . . . "	42	42	42	48	48	48	48	48
Size of Fire Doors . . . . . "	13x22	13x22	13x22	13x22	13x22	13x22	13x22	13x22
Water line height . . . . . "	58	58	58	61 <sup>1</sup> / <sub>2</sub>	61 <sup>1</sup> / <sub>2</sub>	61 <sup>1</sup> / <sub>2</sub>	61 <sup>1</sup> / <sub>2</sub>	61 <sup>1</sup> / <sub>2</sub>
Size Flow and Return flanges (1 each) . . . . . "	4	4	5	5	6	6	6	7
Smoke Bonnet (inside) . . . . . "	10x16	10x16	10x16	10x21	10x21	10x21	10x21	10x21
Approx. wt. of Boiler . . . . . lbs.	6000	6500	6800	7400	8300	9200	10000	11000
Steam Rating . . . . . sq. ft.	1200	1500	1800	2200	2600	3000	3600	4500
Water Rating . . . . . "	2000	2500	3000	3600	4300	5000	6000	7500
Price, complete with casting and trimmings . . . . .	\$565 00	\$615 00	\$665 00	\$715 00	\$790 00	\$865 00	\$975 00	\$1,140 00

Orders for boilers of this type should specify whether they are intended for use in connection with hard or soft coal as fuel. When required for government work or when specifications are to be complied with a copy of the complete specifications, in so far as the boiler is concerned, should accompany the order.

We do not furnish with these boilers brass chains or pulleys, gate valves, piping, blow-off valves and such other special parts of trimmings occasionally specified. No fire tools are supplied with these boilers, except hoe and poker.

# Price List American Direct Radiators

Per Square Foot of Heating Surface. Subject to Change Without Notice

Height, inches .....	45	44	38	33	32	28	26	23	22	20	18	16	15	14	13
Price per square foot.....	41c	41c	42c	46c	46c	48c	50c	53c	53c	57c	58c	60c	62c	64c	66c
<b>Single-Column :</b>															
National and Peerless, Single-Column, steam and water.....	...	...	3	...	2½	...	2	1⅔	...	1½	...	...	...	...	...
Rococo, Single-Column, Ornamental, steam and water.....	...	...	3	...	2½	...	2	1⅔	..	1½	...	...	...	...	...
<b>Two-Column :</b>															
Astro, water or steam .....	5	...	4	...	3½	...	2⅔	...	...	2	...	...	...	...	...
National, Two-Column, steam and water .....	5	...	4	...	3½	...	2⅔	2⅓	...	2	...	...	...	...	...
Peerless, Two-Column, steam and water .....	5	...	4	...	3½	...	2⅔	2⅓	...	2	...	...	1½	...	...
Perfection, Ornamental and Plain, steam.....	5	...	4	...	3½	...	2⅔	2⅓	...	2	...	...	...	...	...
Rococo, Two-Column, Ornamental, steam and water.....	5	...	4	...	3½	...	2⅔	2⅓	...	2	...	...	...	...	...
Verona, steam and water .....	...	...	4	...	3½	...	2⅔	...	...	2	...	...	...	...	...
<b>Three-Column :</b>															
Peerless, Three-Column, steam or water .....	...	6	5	...	4½	...	3¾	...	3	...	2¾	...	...	...	...
Rococo, Three-Column, Ornamental and Plain, steam and water .....	...	6	5	...	4½	...	3¾	...	3	...	2¾	...	...	...	...
<b>Four-Column :</b>															
Peerless, Four-Column, steam or water.....	10	...	8	...	6½	...	5	...	4	...	3	...	...	...	...
Rococo, Four-Column, Ornamental, steam or water .....	10	...	8	...	6½	...	5	...	4	...	3	...	...	...	...

# Price List American Direct Radiators—Continued

Per Square Foot of Heating Surface. Subject to Change Without Notice

Height, inches.....	45	44	38	33	32	28	26	23	22	20	18	16	15	14	13
Price per square foot.....	41c	41c	42c	46c	46c	48c	50c	53c	53c	57c	58c	60c	62c	64c	66c
<b>Flue and Window:</b>															
Ætna Flue, steam or water.....	....	....	....	....	....	....	....	....	....	6	5½	4¾	....	4	3¾
Areal Sanitary Box Base (Prices made on special quotation)....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Italian Flue, Ornamental, steam and water.....	....	....	7	....	5¾	....	4½	....	....	3¼	....	....	....	....	....
Zenith Flue, steam and water.....	....	....	7	6	....	5	....	4	....	....	....	....	....	....	....
Zenith Window, steam or water.....	....	....	....	....	....	....	....	....	....	6	5½	4¾	....	4	....
Rococo Window, steam or water.....	....	....	....	....	....	....	....	....	....	5	....	....	....	....	3

The locations of the figures in the above columns in line with the names of patterns of Radiators indicate the heights in which the various patterns are made. The figures themselves represent the amount of heating surface contained in each height section.

## Rococo Wall Radiators

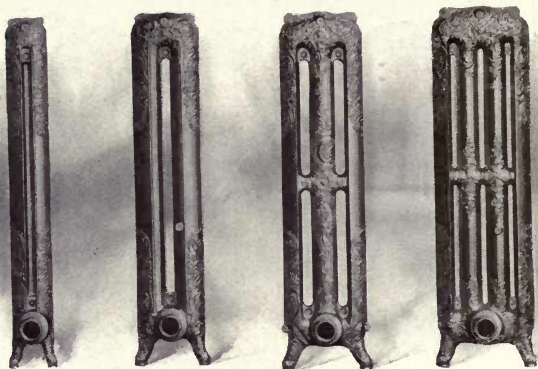
Extra Large section, 9 square feet; Standard section, 7 square feet; Small section, 5 square feet.....	Per Square Foot	42c
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## Price List of American Indirect Radiators

	Per Section	Per Section	
Excelsior, steam and water, 12 square feet.....	\$3 24	Perfection Pin, Extra Large, steam or water, 15 square feet \$4 05	
Excelsior Jr. steam, 8 square feet.....	2 16	Cardinal, steam or water, 15 square feet.....	4 05
Perfection Pin, Standard Size, steam or water, 10 square feet 2 70		Sterling, steam or water, 20 square feet.....	5 40
Sanitary School Pin, steam or water, 20 square feet.....			5 40

Vento Hot Blast Heaters, 50 cents per square foot

## Radiator Variety and Groups



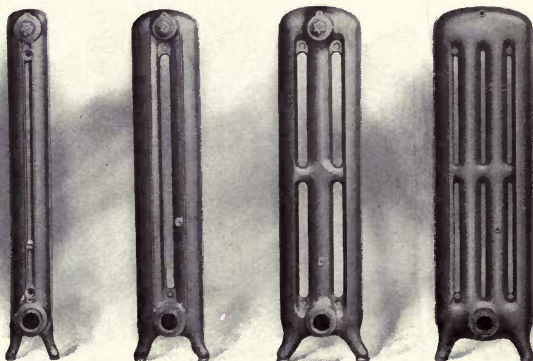
Rococo One, Two, Three and Four-Column



Rococo Window



Rococo Wall



Peerless One, Two, Three and Four-Column



# Radiator Variety and Groups

The leading general feature of AMERICAN Radiators is the unequaled variety of different shapes, sizes, and styles of ornamentation, in which they are made. They are produced in nearly 300 different regular forms and about 900 different special forms, making a total of about 1,200 groups of radiating surfaces. Averaging the possible formation of each typical radiator into stacks of from 2 to 32 sections each, we manufacture about 37,000 *different radiators*.

Our lines are also notable for a wide variety of artistic styles of ornamentation which permit selections that harmonize with any of the modern popular styles of architectural finish or decoration. For instance, either the Renaissance, Byzantine, Rococo, Mission, Colonial or Empire styles of structure or wall ornamentation may be employed throughout a home, or several of these styles may be utilized in different rooms, and selections can be made from AMERICAN Radiators to harmonize with these decorations, varied or otherwise.

There are occasional instances where radiation is wanted in one style and in various widths for different parts of a building. Therefore, for the assistance of Architects, Engineers, Heating Contractors and Fitters, we herewith set forth the various typical groups of our Radiator products having more than one sectional construction, so that they may be more readily specified or selected for work requiring one pattern of uniform outlines or ornamentation, in different widths.

Groups and Data

Name	Construction	Width inches	Width of Legs inches	Pages
Rococo .....	1-Column	4½	5½	86, 87
	2-Column	7¾	8½	96, 97
	3-Column	9¼	10	110 - 115
	4-Column	10½	11¼	118, 119
	Window	12½	12½	130
	Wall	13¼	2⅞ thick	173 - 184
Peerless .....	1-Column	4½	5½	91 - 93
	2-Column	7¾	8½	106, 107
	3-Column	9	10	116, 117
	4-Column	10½	11¼	122, 123

A reference to the pages noted above will indicate to what extent these groups are made up into odd shapes for special and irregular locations.

# Rococo Single-Column Orna. Radiators

For Steam and Water



Each section is  $4\frac{1}{2}$  inches wide. Width of legs  $5\frac{1}{2}$  inches.

Single-Column Radiators for Steam are connected with right-hand threaded, extra heavy nipples; for Water, extra heavy slip nipples, at top and bottom. For two-pipe steam work the supply-leg section is constructed with low-drip hub.

This pattern of Single-Column Radiators is made in special shapes as follows:

Concealed Brackets, for Steam or Water.....see page 48  
Legs, Extra High Solid, for Steam .....see page 108  
Marble-Top, with Saddles, for Steam and Water .....see page 108

# Rococo Single-Column Orna. Radiators

## For Steam and Water

No. of Sections	*Length 2½ inches per Sec.	HEATING SURFACE—SQUARE FEET.				
		38-in. Height. 3 sq. ft. per Sec.	32-in. Height. 2½ sq. ft. per Sec.	26-in. Height. 2 sq. ft. per Sec.	23-in. Height. 1⅓ sq. ft. per Sec.	20-in. Height. 1½ sq. ft. per Sec.
2	5	6	5	4	3⅓	3
3	7½	9	7½	6	5	4½
4	10	12	10	8	6⅔	6
5	12½	15	12½	10	8⅓	7½
6	15	18	15	12	10	9
7	17½	21	17½	14	11⅔	10½
8	20	24	20	16	13⅓	12
9	22½	27	22½	18	15	13½
10	25	30	25	20	16⅔	15
11	27½	33	27½	22	18⅓	16½
12	30	36	30	24	20	18
13	32½	39	32½	25	21⅔	19½
14	35	42	35	28	23⅓	21
15	37½	45	37½	30	25	22½
16	40	48	40	32	26⅔	24
17	42½	51	42½	34	28⅓	25½
18	45	54	45	36	30	27
19	47½	57	47½	38	31⅔	28½
20	50	60	50	40	33⅓	30
21	52½	63	52½	42	35	31½
22	55	66	55	44	36⅔	33
23	57½	69	57½	46	38⅓	34½
24	60	72	60	48	40	36
25	62½	75	62½	50	41⅔	37½
26	65	78	65	52	43⅓	39
27	67½	81	67½	54	45	40½
28	70	84	70	56	46⅔	42
29	72½	87	72½	58	48⅓	43½
30	75	90	75	60	50	45
31	77½	93	77½	62	51⅔	46½
32	80	96	80	64	53⅓	48

These Radiators for Steam and for Water are tapped 2 inches and bushed as per list on page 112.

Distance from floor to center of either supply or return tapping is 4½ inches for Water, 4 inches for Steam, 4½ inches for supply, and 4 inches for return, for two-pipe steam.

\* In estimating *length* of this Radiator allow ½ inch for each bushing.

### Special Tappings

In this pattern of Water Radiators (when so specially ordered), the distance between centers of upper and lower tapings is—in the 38-inch Height, 31⅓ inches; 32-inch Height, 25⅓ inches; 26-inch Height, 19½ inches; 23-inch Height, 16⅓ inches; 20-inch Height, 13⅓ inches. (See page 111.)

# National Single-Column Radiators

For Steam and Water



Each section is  $4\frac{1}{2}$  inches wide. Width of legs  $5\frac{1}{2}$  inches.

Single-Column Radiators for Steam are connected with right-hand threaded, extra-heavy nipples; for Water, extra-heavy slip-nipples, at top and bottom.

For two-pipe steam work the supply leg section is constructed with low-drip hub.

This pattern of Single-Column Radiators is made in special shapes as follows:

Circular for Steam only .....see pages 98 and 101  
Curved for Steam only .....see page 105  
Legs, Extra High Solid, for Steam.....see page 108  
Marble-Top, with Saddles, for Steam and Water. ....see page 108

# National Single-Column Radiators

For Steam and Water

No. of Sections	*Length 2½ inches per Sec.	HEATING SURFACE—SQUARE FEET.				
		38-in. Height. 3 sq. ft. per Sec.	32-in. Height. 2½ sq. ft. per Sec.	26-in. Height. 2 sq. ft. per Sec.	23-in. Height. 1⅓ sq. ft. per Sec.	20-in. Height. 1½ sq. ft. per Sec.
2	5	6	5	4	3⅓	3
3	7½	9	7½	6	5	4½
4	10	12	10	8	6⅔	6
5	12½	15	12½	10	8⅓	7½
6	15	18	15	12	10	9
7	17½	21	17½	14	11⅔	10½
8	20	24	20	16	13⅓	12
9	22½	27	22½	18	15	13½
10	25	30	25	20	16⅔	15
11	27½	33	27½	22	18⅓	16½
12	30	36	30	24	20	18
13	32½	39	32½	26	21⅔	19½
14	35	42	35	28	23⅓	21
15	37½	45	37½	30	25	22½
16	40	48	40	32	26⅔	24
17	42½	51	42½	34	28⅓	25½
18	45	54	45	36	30	27
19	47½	57	47½	38	31⅔	28½
20	50	60	50	40	33⅓	30
21	52½	63	52½	42	35	31½
22	55	66	55	44	36⅔	33
23	57½	69	57½	46	38⅓	34½
24	60	72	60	48	40	36
25	62½	75	62½	50	41⅔	37½
26	65	78	65	52	43⅓	39
27	67½	81	67½	54	45	40½
28	70	84	70	56	46⅔	42
29	72½	87	72½	58	48⅓	43½
30	75	90	75	60	50	45
31	77½	93	77½	62	51⅔	46½
32	80	96	80	64	53⅓	48

These Radiators are *tapped solid* as per list on page 112 (except with High Legs, which are tapped 2 inches and bushed).

Distance from floor to center of either supply or return tapping is 4½ inches for Water; 4 inches for Steam; 4½ inches for supply, and 4 inches for return, for two-pipe Steam.

\*In estimating *length* of this Radiator allow ½ inch for each bushing.

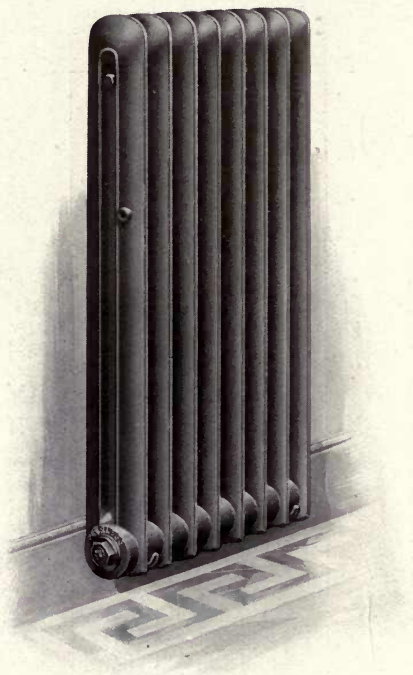
## Special Tappings

In this pattern of Water Radiators (when so specially ordered), the distance between centers of upper and lower tappings is—in the 38-inch Height, 31⅞ inches; 32-inch Height, 25⅜ inches; 26-inch Height, 19½ inches; 23-inch Height, 16⅞ inches; 20-inch Height, 13⅝ inches. (See page 111.)



# Direct Radiators on Brackets

For Steam and Water



Peerless Single Column

Illustration above is to show how Radiator may be supported by Concealed Brackets. For description of Brackets and their special uses, see page 110.

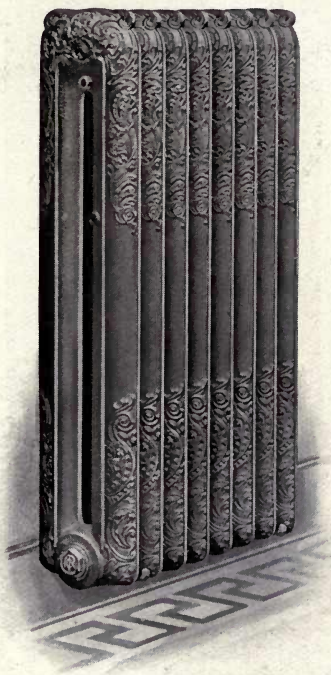
Rococo one-, two-, and three-column and Peerless single-column radiators can be fitted with these brackets on special orders.

NOTE.—Orders which call for “Radiators without legs, to be used in connection with Brackets,” will be understood by plant to mean Radiators with the regular end leg, but with the feet cut off, and will have the regular outside tapping into which a bushing can be screwed and will have the regular air-vent.



# Direct Radiators on Brackets

For Steam and Water



Rococo Two-Column

This type of Radiator is very desirable for use in narrow corridors, or in rooms where floor space is limited; specially advantageous for side walls, or in basements above the water line of Steam Boilers. Can be used for heating aspirating shafts in ventilating work, etc.

The same data as regards heating surface, threading, nipple connection, and tapping applies to these patterns as to Radiators having feet.

# Peerless Single-Column Radiators

For Steam and Water



Each section is  $4\frac{1}{2}$  inches wide. Width of legs  $5\frac{1}{2}$  inches.

Single-Column Radiators for Steam are connected with right-hand threaded extra-heavy nipples; for Water, extra-heavy slip-nipples,  $1\frac{1}{2}$ " at top and 2" bottom.

For two-pipe Steam work the supply-leg section is constructed with low-drip hub.

This pattern of Single-Column Radiators is made in special shapes as follows:

Circular, for Steam only .....	see pages 98 and 101
Concealed Brackets, for Steam or Water .....	see page 48
Corner, for Steam only .....	see pages 102 to 104
Curved, for Steam only .....	see page 105
Legs, extra High Solid, for Steam .....	see page 108
Marble-Top, with Saddles, for Steam and Water .....	see page 108

# Peerless Single-Column Radiators

## For Steam and Water

No. of Sections	*Length 2½ inches per Sec.	HEATING SURFACE—SQUARE FEET.				
		38-in. Height. 3 sq. ft. per Sec.	32-in. Height. 2½ sq. ft. per Sec.	26-in. Height. 2 sq. ft. per Sec.	23-in. Height. 1⅔ sq. ft. per Sec.	20-in. Height. 1½ sq. ft. per Sec.
2	5	6	5	4	3⅓	3
3	7½	9	7½	6	5	4½
4	10	12	10	8	6⅔	6
5	12½	15	12½	10	8⅓	7½
6	15	18	15	12	10	9
7	17½	21	17½	14	11⅔	10½
8	20	24	20	16	13⅓	12
9	22½	27	22½	18	15	13½
10	25	30	25	20	16⅔	15
11	27½	33	27½	22	18⅓	16½
12	30	36	30	24	20	18
13	32½	39	32½	26	21⅔	19½
14	35	42	35	28	23⅓	21
15	37½	45	37½	30	25	22½
16	40	48	40	32	26⅔	24
17	42½	51	42½	34	28⅓	25½
18	45	54	45	36	30	27
19	47½	57	47½	38	31⅔	28½
20	50	60	50	40	33⅓	30
21	52½	63	52½	42	35	31½
22	55	66	55	44	36⅔	33
23	57½	69	57½	46	38⅓	34½
24	60	72	60	48	40	36
25	62½	75	62½	50	41⅔	37½
26	65	78	65	52	43⅓	39
27	67½	81	67½	54	45	40½
28	70	84	70	56	46⅔	42
29	72½	87	72½	58	48⅓	43½
30	75	90	75	60	50	45
31	77½	93	77½	62	51⅔	46½
32	80	96	80	64	53⅓	48

These Radiators tapped 2 inches and bushed as per list on page 112.

Distance from floor to center of either supply or return tapping is 4½ inches for Water, 4 inches for Steam, 4½ inches for supply and 4 inches for return for two-pipe Steam.

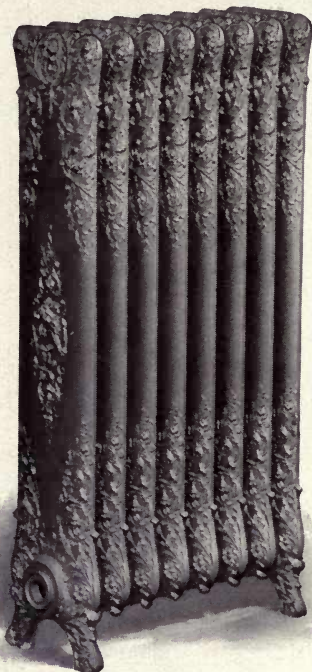
\*In estimating *length* of this Radiator allow ½ inch for each bushing.

### Special Tappings

In this pattern of Water Radiators (when so specially ordered), the distance between centers of upper and lower tappings is—in the 38-inch Height, 31⅓ inches; 32-inch Height, 25⅓ inches; 26-inch Height, 19½ inches; 23-inch Height, 16⅓ inches; 20-inch Height, 13⅓ inches. (See page 111.)

# Verona Steam and Water Radiators

Patented Nov. 3, 1896



Each section is 8 inches wide.

Width of legs,  $8\frac{1}{2}$  inches.

Connected with extra-heavy right- and left-hand threaded nipples. For two-pipe steam work the supply leg section is constructed with low-drip hub.

Verona Radiators are made in special shapes as follows:

Curved for Steam and Water.....see page 105  
Corner for Steam and Water.....see pages 102 to 104  
Legs, Detachable High, for Steam and Water.....see page 107  
Marble-Top, with Lugs, for Steam and Water.....see page 108

# Verona Steam and Water Radiators

Number Sections.	*Length, 2½ in. per Section.	HEATING SURFACE—SQUARE FEET.			
		38-in. Height. 4 sq. ft. per Section.	32 in. Height. 3½ sq. ft. per Section.	26 in. Height. 2½ sq. ft. per Section.	20-in. Height. 2 sq. ft. per Section.
2	5	8	6¾	5½	4
3	7½	12	10	8	6
4	10	16	13½	10¾	8
5	12½	20	16¾	13½	10
6	15	24	20	16	12
7	17½	28	23½	18¾	14
8	20	32	26¾	21½	16
9	22½	36	30	24	18
10	25	40	33½	26¾	20
11	27½	44	36¾	29½	22
12	30	48	40	32	24
13	32½	52	43½	34¾	26
14	35	56	46¾	37½	28
15	37½	60	50	40	30
16	40	64	53½	42¾	32
17	42½	68	56¾	45½	34
18	45	72	60	48	36
19	47½	76	63½	50¾	38
20	50	80	66¾	53½	40
21	52½	84	70	56	42
22	55	88	73½	58¾	44
23	57½	92	76¾	61½	46
24	60	96	80	64	48
25	62½	100	83½	66¾	50
26	65	104	86¾	69½	52
27	67½	108	90	72	54
28	70	112	93½	74¾	56
29	72½	116	96¾	77½	58
30	75	120	100	80	60
31	77½	124	103½	82¾	62
32	80	128	106¾	85½	64

The Verona Radiator is tapped two inches, and bushed as per regular list on page 112.

Distance from floor to center of tapping: single-pipe Steam, 4 inches; double-pipe Steam, 4½ inches supply, 4 inches return; Hot Water, supply and return, 4½ inches.

Top of each Verona Water leg section has 1½ inch plug, which can be taken out to make top connection when desired; distance between centers of upper and lower tappings is— in the 38-inch Height, 31½ inches; 32-inch Height, 25¾ inches; 26-inch Height, 19½ inches; 20-inch Height, 13½ inches.

\* In estimating *length* of Radiator allow ½ inch for each bushing.



# Rococo Two-Column Orna. Radiators

For Steam and Water



Each section is  $7\frac{3}{8}$  inches wide.

Width of legs,  $8\frac{1}{2}$  inches.

Connected at bottom with extra-heavy right-hand threaded nipples for Steam. Made for water with extra-heavy slip-nipples at top and bottom at Pierce plant, and with extra-heavy right- and left-hand threaded nipples at Detroit and Litchfield Plants. The Rococo Two-Column Water Radiators made at Detroit and Litchfield Plants are interchangeable.

For two-pipe Steam work the supply-leg section is constructed with low drip hub.

Rococo Two-Column Radiators are made in special shapes as follows:

Legs, Extra High Solid, for Steam and Water.....see page 108  
Marble-Top, with saddles, for Steam and Water.....see page 108



# Rococo Two-Column Orna. Radiators

For Steam and Water

No. of Sections	*Length 2½ in. per Sec.	HEATING SURFACE—SQUARE FEET					
		45-in. Height. 5 sq. ft. per Sec.	38-in. Height. 4 sq. ft. per Sec.	32-in. Height. 3½ sq. ft. per Sec.	26-in. Height. 2½ sq. ft. per Sec.	23 in. Height. 2⅓ sq. ft. per Sec.	20-in. Height. 2 sq. ft. per Sec.
2	5	10	8	6½	5½	4½	4
3	7½	15	12	10	8	7	6
4	10	20	16	13½	10½	9½	8
5	12½	25	20	16½	13½	11½	10
6	15	30	24	20	16	14	12
7	17½	35	28	23½	18½	16½	14
8	20	40	32	26½	21½	18½	16
9	22½	45	36	30	24	21	18
10	25	50	40	33½	26½	23½	20
11	27½	55	44	36½	29½	25½	22
12	30	60	48	40	32	28	24
13	32½	65	52	43½	34½	30½	26
14	35	70	56	46½	37½	32½	28
15	37½	75	60	50	40	35	30
16	40	80	64	53½	42½	37½	32
17	42½	85	68	56½	45½	39½	34
18	45	90	72	60	48	42	36
19	47½	95	76	63½	50½	44½	38
20	50	100	80	66½	53½	46½	40
21	52½	105	84	70	56	49	42
22	55	110	88	73½	58½	51½	44
23	57½	115	92	76½	61½	53½	46
24	60	120	96	80	64	56	48
25	62½	125	100	83½	66½	58½	50
26	65	130	104	86½	69½	60½	52
27	67½	135	108	90	72	63	54
28	70	140	112	93½	74½	65½	56
29	72½	145	116	96½	77½	67½	58
30	75	150	120	100	80	70	60
31	77½	155	124	103½	82½	72½	62
32	80	160	128	106½	85½	74½	64

Above Radiators are tapped 2 inches, and bushed as per list on page 112.

Distance from floor to center of tapping: single-pipe Steam, 4 inches; double-pipe Steam, 4½ inches supply, 4 inches return; Water, supply and return, 4½ inches.

## Special Tappings

These Radiators when specially ordered can be tapped as illustrated on page 111. When so tapped the distance between centers of upper and lower tappings is—in the 45-inch Height, 38½ inches; 38-inch Height, 31½ inches; 32-inch Height, 25½ inches; 26-inch Height, 19½ inches; 23-inch Height, 16½ inches; 20-inch Height, 13½ inches.

\* In estimating length of Radiator allow ½ inch for each bushing.

# Perfection Ornamental Radiators

For Steam Only



Each section is  $7\frac{1}{4}$  inches wide. Width of legs,  $9\frac{1}{4}$  inches.  
Connected with extra-heavy right- and left-hand threaded nipples.  
For two-pipe Steam work the supply-leg section is constructed with low-drip hub.

Perfection Radiators are made in special shapes as follows :

Carpet Feet, Steam only.....	see page 106
Cast-iron Top, for Steam only. (Illustration on request.)	
Circular for Steam only.....	see pages 98 and 100
Curved for Steam only.....	see page 105
Corner for Steam only.....	see pages 102 to 104
Dining-room, 38-in. Height, Steam only...	see page 95
Legs, Detachable High, for Steam only.....	see page 107
Marble-Top, with Lugs, for Steam only.....	see page 108

# Perfection Ornamental Radiators

For Steam only

No. of Sec- tions	*Length 2½ in. per Sec.	HEATING SURFACE—SQUARE FEET					
		45-in. Height. 5 sq. ft. per Sec.	38-in. Height. 4 sq. ft. per Sec.	32-in. Height. 3½ sq. ft. per Sec.	26-in. Height. 2½ sq. ft. per Sec.	23 in. Height. 2½ sq. ft. per Sec.	20-in. Height. 2 sq. ft. per Sec.
2	5	10	8	6½	5½	4½	4
3	7½	15	12	10	8	7	6
4	10	20	16	13½	10½	9½	8
5	12½	25	20	16½	13½	11½	10
6	15	30	24	20	16	14	12
7	17½	35	28	23½	18½	16½	14
8	20	40	32	26½	21½	18½	16
9	22½	45	36	30	24	21	18
10	25	50	40	33½	26½	23½	20
11	27½	55	44	36½	29½	25½	22
12	30	60	48	40	32	28	24
13	32½	65	52	43½	34½	30½	26
14	35	70	56	46½	37½	32½	28
15	37½	75	60	50	40	35	30
16	40	80	64	53½	42½	37½	32
17	42½	85	68	56½	45½	39½	34
18	45	90	72	60	48	42	36
19	47½	95	76	63½	50½	44½	38
20	50	100	80	66½	53½	46½	40
21	52½	105	84	70	56	49	42
22	55	110	88	73½	58½	51½	44
23	57½	115	92	76½	61½	53½	46
24	60	120	96	80	64	56	48
25	62½	125	100	83½	66½	58½	50
26	65	130	104	86½	69½	60½	52
27	67½	135	108	90	72	63	54
28	70	140	112	93½	74½	65½	56
29	72½	145	116	96½	77½	67½	58
30	75	150	120	100	80	70	60
31	77½	155	124	103½	82½	72½	62
32	80	160	128	106½	85½	74½	64

Above Steam Radiators are tapped 2 inches and bushed as per regular list on page 112.

Distance from floor to center of tapping: single-pipe Steam, 4 inches; double-pipe Steam, 4½ inches supply, 4 inches return.

\*In estimating *length* of Radiator, allow ½ inch for each bushing.

# National Two-Column Radiators

For Steam and Water



Each section is  $7\frac{3}{8}$  inches wide.

Width of legs,  $8\frac{1}{2}$  inches.

Connected at bottom with extra-heavy right-hand threaded nipples for Steam; extra-heavy slip-nipples for Water. For two-pipe Steam work the supply-leg section is constructed with low-drip hub.

National Two-Column Radiators are made in special shapes as follows:  
Circular for Steam only.....see pages 98 and 101  
Curved for Steam only .....see page 105  
Legs, Extra High Solid, for Steam and Water.....see page 108  
Marble-Top, with Saddles, for Steam and Water.....see page 108

# National Two-Column Radiators

For Steam and Water.

No. of Sections	*Length 2½ in. per Sec.	HEATING SURFACE—SQUARE FEET					
		45-in. Height. 5 sq. ft. per Sec.	38-in. Height. 4 sq. ft. per Sec.	32-in. Height. 3½ sq. ft. per Sec.	26-in. Height. 2½ sq. ft. per Sec.	23 in. Height. 2½ sq. ft. per Sec.	20-in. Height. 2 sq. ft. per Sec.
2	5	10	8	6¾	5½	4¾	4
3	7½	15	12	10	8	7	6
4	10	20	16	13½	10¾	9½	8
5	12½	25	20	16¾	13½	11¾	10
6	15	30	24	20	16	14	12
7	17½	35	28	23½	18¾	16½	14
8	20	40	32	26¾	21½	18¾	16
9	22½	45	36	30	24	21	18
10	25	50	40	33½	26¾	23½	20
11	27½	55	44	36¾	29½	25¾	22
12	30	60	48	40	32	28	24
13	32½	65	52	43½	34¾	30½	26
14	35	70	56	46¾	37½	32¾	28
15	37½	75	60	50	40	35	30
16	40	80	64	53½	42¾	37½	32
17	42½	85	68	56¾	45½	39¾	34
18	45	90	72	60	48	42	36
19	47½	95	76	63½	50¾	44½	38
20	50	100	80	66¾	53½	46¾	40
21	52½	105	84	70	56	49	42
22	55	110	88	73½	58¾	51½	44
23	57½	115	92	76¾	61½	53¾	46
24	60	120	96	80	64	56	48
25	62½	125	100	83½	66¾	58½	50
26	65	130	104	86¾	69½	60¾	52
27	67½	135	108	90	72	63	54
28	70	140	112	93½	74¾	65½	56
29	72½	145	116	96¾	77½	67¾	58
30	75	150	120	100	80	70	60
31	77½	155	124	103½	82¾	72½	62
32	80	160	128	106¾	85½	74¾	64

Above Radiators are tapped 2 inches, and bushed as per list on page 112.

Distance from floor to center of tapping: single-pipe Steam, 4 inches; double-pipe Steam, 4½ inches supply, 4 inches return; Water, supply and return, 4½ inches.

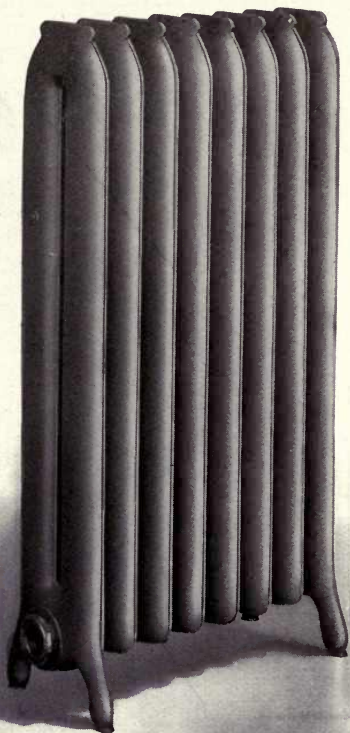
\*In estimating length of Radiator, allow ½ inch for each bushing.

## Special Tappings

These radiators, when specially ordered, can be tapped as illustrated on page 111. When so tapped the distance between centers of upper and lower tapings is—in the 45-inch Height, 38½ inches; 38-inch Height, 31½ inches; 32-inch Height, 25½ inches; 26-inch Height, 19½ inches; 23-inch Height, 16½ inches; 20-inch Height, 13½ inches.

# Perfection Plain Radiators

For Steam Only



Each section is  $7\frac{1}{4}$  inches wide.

Width of legs,  $9\frac{1}{4}$  inches.

Connected with extra heavy right- and left-hand threaded nipples.

Perfection Plain Steam Radiators are not furnished in any special shape.

For two-pipe Steam work the supply-leg section is constructed with low-drip hub.



# Perfection Plain Steam Radiators

No. of Sections	*Length 2½ in. per Sec.	HEATING SURFACE—SQUARE FEET					
		45-in. Height. 5 sq. ft. per Sec.	38-in. Height. 4 sq. ft. per Sec.	32-in. Height. 3⅓ sq. ft. per Sec.	26-in. Height. 2⅔ sq. ft. per Sec.	23-in. Height. 2⅓ sq. ft. per Sec.	20-in. Height. 2 sq. ft. per Sec.
2	5	10	8	6⅔	5⅓	4⅔	4
3	7½	15	12	10	8	7	6
4	10	20	16	13⅓	10⅔	9⅓	8
5	12½	25	20	16⅔	13⅓	11⅓	10
6	15	30	24	20	16	14	12
7	17½	35	28	23⅓	18⅔	16⅓	14
8	20	40	32	26⅔	21⅓	18⅔	16
9	22½	45	36	30	24	21	18
10	25	50	40	33⅓	26⅔	23⅓	20
11	27½	55	44	36⅔	29⅓	25⅓	22
12	30	60	48	40	32	28	24
13	32½	65	52	43⅓	34⅔	30⅓	26
14	35	70	56	46⅔	37⅔	32⅔	28
15	37½	75	60	50	40	35	30
16	40	80	64	53⅓	42⅔	37⅓	32
17	42½	85	68	56⅔	45⅓	39⅔	34
18	45	90	72	60	48	42	36
19	47½	95	76	63⅓	50⅔	44⅓	38
20	50	100	80	66⅔	53⅓	46⅔	40
21	52½	105	84	70	56	49	42
22	55	110	88	73⅓	58⅔	51⅓	44
23	57½	115	92	76⅔	61⅓	53⅔	46
24	60	120	96	80	64	56	48
25	62½	125	100	83⅓	66⅔	58⅓	50
26	65	130	104	86⅔	69⅓	60⅔	52
27	67½	135	108	90	72	63	54
28	70	140	112	93⅓	74⅔	65⅓	56
29	72½	145	116	96⅔	77⅓	67⅔	58
30	75	150	120	100	80	70	60
31	77½	155	124	103⅓	82⅔	72⅓	62
32	80	160	128	106⅔	85⅓	74⅔	64

Above Radiators are tapped 2 inches, and bushed according to list on page 112.

Distance from floor to center of tapping: single-pipe Steam, 4 inches; double-pipe Steam, supply 4½ inches, return 4 inches.

\*In estimating *length* of Radiator, allow ½ inch for each bushing.

# Peerless Two-Column Radiators

For Steam and Water



Each section is  $7\frac{3}{8}$  inches wide. Width of legs,  $8\frac{1}{2}$  inches.

Connected at top and bottom with extra-heavy slip-nipples for Water; and extra-heavy right-hand threaded nipples at bottom for Steam. For two-pipe Steam work the supply-leg section is constructed with low-drip hub.

Peerless Two-Column Radiators are made in special shapes as follows:

Circular for Steam only .....	see pages 98 and 101
Corner for Steam only .....	see pages 102 to 104
Curved for Steam only .....	see page 105
Legs, Extra High Solid, for Steam and Water.....	see page 108
Marble-Top, with saddles for, Steam and Water.....	see page 108

# Peerless Two-Column Radiators

## For Steam and Water

No. of Sections	*Length 2½-in. per Sec.	HEATING SURFACE—SQUARE FEET						
		45-in. Height. 5 sq. ft. per Sec.	38-in. Height. 4 sq. ft. per Sec.	32-in. Height. 3½ sq. ft. per Sec.	26-in. Height. 2½ sq. ft. per Sec.	23-in. Height. 2½ sq. ft. per Sec.	20-in. Height. 2 sq. ft. per Sec.	†15-in. Height. 1½ sq. ft. per Sec.
2	5	10	8	6¾	5½	4¾	4	3
3	7½	15	12	10	8	7	6	4½
4	10	20	16	13½	10¾	9½	8	6
5	12½	25	20	16¾	13½	11¾	10	7½
6	15	30	24	20	16	14	12	9
7	17½	35	28	23½	18¾	16½	14	10½
8	20	40	32	26¾	21½	18¾	16	12
9	22½	45	36	30	24	21	18	13½
10	25	50	40	33½	26¾	23½	20	15
11	27½	55	44	36¾	29½	25¾	22	16½
12	30	60	48	40	32	28	24	18
13	32½	65	52	43½	34¾	30½	26	19½
14	35	70	56	46¾	37½	32¾	28	21
15	37½	75	60	50	40	35	30	22½
16	40	80	64	53½	42¾	37½	32	24
17	42½	85	68	56¾	45½	39¾	34	25½
18	45	90	72	60	48	42	36	27
19	47½	95	76	63½	50¾	44½	38	28½
20	50	100	80	66¾	53½	46¾	40	30
21	52½	105	84	70	56	49	42	31½
22	55	110	88	73½	58¾	51½	44	33
23	57½	115	92	76¾	61½	53¾	46	34½
24	60	120	96	80	64	56	48	36
25	62½	125	100	83½	66¾	58½	50	37½
26	65	130	104	86¾	69½	60¾	52	39
27	67½	135	108	90	72	63	54	40½
28	70	140	112	93½	74¾	65½	56	42
29	72½	145	116	96¾	77½	67¾	58	43½
30	75	150	120	100	80	70	60	45
31	77½	155	124	103½	82¾	72½	62	46½
32	80	160	128	106¾	85½	74¾	64	48

Above radiators are tapped 2 inches, and bushed as per list on page 112.

Distance from floor to center of tapping: single-pipe Steam, 4 inches; double-pipe Steam, 4½ inches supply; 4 inches return; Water, supply and return, 4½ inches.

\*In estimating length of Radiator, allow ½ inch for each bushing.

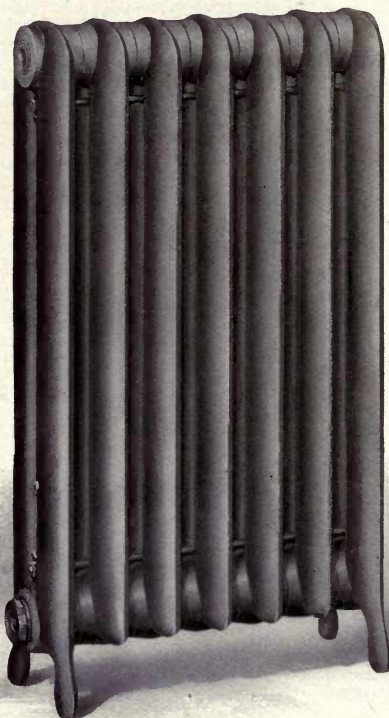
†15-inch height is not made for water.

### Special Tappings

Radiators when specially ordered can be tapped as illustrated on page 111. When so tapped the distance between centers of upper and lower tappings is—in the 45-inch Height, 38½ inches; 38-inch Height, 31½ inches; 32-inch Height, 25¾ inches; 26-inch Height, 19½ inches; 23-inch Height, 16⅞ inches; 20-inch Height, 13¾ inches.

# Astro Two-Column Radiators

For Water or Steam



Each section is  $7\frac{3}{8}$  inches wide.

Width of legs,  $8\frac{1}{2}$  inches.

Connected with extra-heavy slip nipples, at top and bottom.

Astro Two-Column Radiators are not made in any special or odd shapes.

# Astro Two-Column Radiators

## For Water or Steam

No. of Sections	*Length 3 inches per Sec.	HEATING SURFACE—SQUARE FEET.				
		45-in. Height. 5 sq. ft. per Sec.	38-in. Height. 4 sq. ft. per Sec.	32-in. Height. 3½ sq. ft. per Sec.	26-in. Height. 2½ sq. ft. per Sec.	20-in. Height. 2 sq. ft. per Sec.
2	6	10	8	6⅔	5⅓	4
3	9	15	12	10	8	6
4	12	20	16	13⅓	10⅔	8
5	15	25	20	16⅔	13⅓	10
6	18	30	24	20	16	12
7	21	35	28	23⅓	18⅔	14
8	24	40	32	26⅔	21⅓	16
9	27	45	36	30	24	18
10	30	50	40	33⅓	26⅔	20
11	33	55	44	36⅔	29⅓	22
12	36	60	48	40	32	24
13	39	65	52	43⅓	34⅔	26
14	42	70	56	46⅔	37⅓	28
15	45	75	60	50	40	30
16	48	80	64	53⅓	42⅔	32
17	51	85	68	56⅔	45⅓	34
18	54	90	72	60	48	36
19	57	95	76	63⅓	50⅔	38
20	60	100	80	66⅔	53⅓	40
21	63	105	84	70	56	42
22	66	110	88	73⅓	58⅔	44
23	69	115	92	76⅔	61⅓	46
24	72	120	96	80	64	48
25	75	125	100	83⅓	66⅔	50
26	78	130	104	86⅔	69⅓	52
27	81	135	108	90	72	54
28	84	140	112	93⅓	74⅔	56
29	87	145	116	96⅔	77⅓	58
30	90	150	120	100	80	60
31	93	155	124	103⅓	82⅔	62
32	96	160	128	106⅔	85⅓	64

Above Radiators are tapped 2 inches and bushed as per list on page. 112  
Distance from floor to center of bottom opening is 4½ inches.

\* In estimating length of Radiator, allow ½ inch for each bushing.

Top of each water leg has plug, which can be taken out to make top connection when desired. In Astro Two-Column Water Radiators, the distance between centers of upper and lower tappings is—in the 45-inch Height, 38⅝ inches; 38-inch Height, 31⅞ inches; 32-inch Height, 25⅝ inches; 26-inch Height, 19⅞ inches; 23-inch Height, 16⅞ inches; 20-inch Height, 13⅞ inches.

# Rococo Three-Column Orna. Radiators

## For Steam and Water



Each section is 9¼ inches wide. Width of legs, 10 inches.

All Rococo Radiators made at Detroit Plant and all Rococo Water Radiators made at Litchfield are connected with extra-heavy right- and left-hand threaded nipples. All Rococo Radiators made at other plants, including Litchfield, are connected with extra-heavy right-hand threaded nipples for Steam; extra-heavy slip-nipples for Water. For two-pipe Steam work the supply-leg section is constructed with low-drip hub.

The Water Radiators made at Detroit and Litchfield are not interchangeable. Made at Detroit Plant in special shapes and on special orders as follows:

- Carpet feet, for Steam and Water ..... see page 106
- Circular, for Steam and Water ..... see pages 98 and 100
- Corner, for Steam and Water ..... see pages 102 to 104
- Curved, for Steam and Water ..... see page 105
- Dining-room 44-in. Height only, for Steam and Water ..... see page 94
- Ventilating ..... see pages 91 to 93
- Legs, Detachable High, for Steam and Water ..... see page 107
- Legs, Extra High Solid, for Steam and Water (Pierce Plant) see page 108
- Marble-Top Lugs, for Steam and Water ..... see page 108
- Marble-Top Saddles, for Steam and Water (Pierce Plant) .... see page 108
- Concealed Brackets, for Steam and Water (Pierce Plant only) see page 110



# Rococo Three-Column Orna. Radiators

For Steam and Water

No. of Sections	*Length 2½ in. per Sec.	HEATING SURFACE—SQUARE FEET					
		44-in. Height, 6 sq. ft. per Sec.	38-in. Height, 5 sq. ft. per Sec.	32-in. Height, 4½ sq. ft. per Sec.	26-in. Height, 3½ sq. ft. per Sec.	22-in. Height, 3 sq. ft. per Sec.	18-in. Height, 2¼ sq. ft. per Sec.
2	5	12	10	9	7½	6	4½
3	7½	18	15	13½	11¼	9	6¾
4	10	24	20	18	15	12	9
5	12½	30	25	22½	18¾	15	11¼
6	15	36	30	27	22½	18	13½
7	17½	42	35	31½	26¼	21	15¾
8	20	48	40	36	30	24	18
9	22½	54	45	40½	33¾	27	20¼
10	25	60	50	45	37½	30	22½
11	27½	66	55	49½	41¼	33	24¾
12	30	72	60	54	45	36	27
13	32½	78	65	58½	48¾	39	29¼
14	35	84	70	63	52½	42	31½
15	37½	90	75	✓ 67½ ✓	56¼	45	33¾
16	40	96	80	72	60	48	36
17	42½	102	85	76½	63¾	51	38¼
18	45	108	90	81	67½	54	40½
19	47½	114	95	85½	71¼	57	42¾
20	50	120	100	90	75	60	45
21	52½	126	105	94½	78¾	63	47¼
22	55	132	110	99	82½	66	49½
23	57½	138	115	103½	86¼	69	51¾
24	60	144	120	108	90	72	54
25	62½	150	125	112½	93¾	75	56¼
26	65	156	130	117	97½	78	58½
27	67½	162	135	121½	101¼	81	60¾
28	70	168	140	126	105	84	63
29	72½	174	145	130½	108¾	87	65¼
30	75	180	150	135	112½	90	67½
31	77½	186	155	139½	116¼	93	69¾
32	80	192	160	144	120	96	72

Above Radiators are tapped 2 inches and bushed as per list on page 112. Distance floor to center of supply or return tapping, 4½ inches for Water; 4 inches for single-pipe Steam; 4½ inches supply, 4 inches return for double-pipe Steam.

Top of leg section, of Detroit and Litchfield Rococo Water Radiators only, has 2-inch plug, which can be taken out to make top connection when desired. Distance between centers of upper and lower tapings is—in the 44-in. Ht., 35¼ in.; 38-in. Ht., 31 in.; 32-in. Ht., 23¾ in.; 26-in. Ht., 18 in.; 22-in. Ht., 14⅛ in.; 18-in. Ht., 10¼ in.

In Rococo Water Radiators, of slip-nipple construction, made at other Plants (when ordered with top and bottom one-end connections), distance is—in the 44-in. Ht., 35⅞ in. 38-in. Ht., 31⅞ in.; 32-in. Ht., 25⅝ in.; 26-in. Ht., 19½ in.; 22-in. Ht., 15⅝ in.; 18-in. Ht., 11⅝ in.

\* In estimating length of Radiator, allow ½-inch for each bushing.

# Rococo Three-Column Plain Radiators

For Steam and Water



Each section is  $9\frac{1}{4}$  inches wide.

Width of legs, 10 inches.

Connected with extra heavy right- and left-hand threaded nipples. For two-pipe Steam work the supply-leg section is constructed with low-drip hub.

Rococo Plain Radiators are made in special shapes as follows:

Circular, for Steam and Water .....	see pages 98 and 100
Corner, for Steam and Water .....	see pages 102 to 104
Curved, for Steam and Water .....	see page 105
Marble-Top Lugs for Steam and Water .....	see page 108

# Rococo Three-Column Plain Radiators

For Steam and Water

No. of Sections	*Length 2½ in. per Sec.	HEATING SURFACE— SQUARE FEET					
		44-in. Height, 6 sq. ft. per Sec.	38-in. Height, 5 sq. ft. per Sec.	32-in. Height, 4½ sq. ft. per Sec.	26-in. Height, 3¾ sq. ft. per Sec.	22-in. Height, 3 sq. ft. per Sec.	18-in. Height, 2½ sq. ft. per Sec.
2	5	12	10	9	7½	6	4½
3	7½	18	15	13½	11¼	9	6¾
4	10	24	20	18	15	12	9
5	12½	30	25	22½	18¾	15	11¼
6	15	36	30	27	22½	18	13½
7	17½	42	35	31½	26¼	21	15¾
8	20	48	40	36	30	24	18
9	22½	54	45	40½	33¾	27	20¼
10	25	60	50	45	37½	30	22½
11	27½	66	55	49½	41¼	33	24¾
12	30	72	60	54	45	36	27
13	32½	78	65	58½	48¾	39	29¼
14	35	84	70	63	52½	42	31½
15	37½	90	75	67½	56¼	45	33¾
16	40	96	80	72	60	48	36
17	42½	102	85	76½	63¾	51	38¼
18	45	108	90	81	67½	54	40½
19	47½	114	95	85½	71¼	57	42¾
20	50	120	100	90	75	60	45
21	52½	126	105	94½	78¾	63	47¼
22	55	132	110	99	82½	66	49½
23	57½	138	115	103½	86¼	69	51¾
24	60	144	120	108	90	72	54
25	62½	150	125	112½	93¾	75	56¼
26	65	156	130	117	97½	78	58½
27	67½	162	135	121½	101¼	81	60¾
28	70	168	140	126	105	84	63
29	72½	174	145	130½	108¾	87	65¼
30	75	180	150	135	112½	90	67½
31	77½	186	155	139½	116¼	93	69¾
32	80	192	160	144	120	96	72

Above Radiators are tapped 2 inches and bushed as per list on page 112. Distance from floor to center of either supply or return tapping is 4½ inches for Water, 4 inches for single-pipe Steam; 4½ inches supply, 4 inches return, for double-pipe steam.

\* In estimating *length* of Radiator, allow ½ inch for each bushing.

Top of each leg section in Water has 2-inch plug which can be taken out to make top connection when desired. Distance between centers of upper and lower tappings is—in the 44-inch Height, 35¼ inches; 38-inch Height, 31 inches; 32-inch Height, 23¾ inches; 26-inch Height, 18 inches; 22-inch Height, 14½ inches; 18-inch Height, 10¼ inches.

# Peerless Three-Column Radiators

For Steam or Water



Each section is 9 inches wide.

Width of legs, 10 inches.

Connected with extra-heavy slip-nipples.

Peerless Three-Column Radiators are not made in special shapes other than that they can be furnished with Saddles for Marble Top, see page 108.

# Peerless Three-Column Radiators

## For Steam or Water

No. of Sections	*Length 2½ in. per Sec.	HEATING SURFACE—SQUARE FEET					
		44-in. Height, 6 sq. ft. per Sec.	38-in. Height, 5 sq. ft. per Sec.	32-in. Height, 4½ sq. ft. per Sec.	26-in. Height, 3½ sq. ft. per Sec.	22-in. Height, 3 sq. ft. per Sec.	18-in. Height, 2½ sq. ft. per Sec.
2	5	12	10	9	7½	6	4½
3	7½	18	15	13½	11¼	9	6¾
4	10	24	20	18	15	12	9
5	12½	30	25	22½	18¾	15	11¼
6	15	36	30	27	22½	18	13½
7	17½	42	35	31½	26¼	21	15¾
8	20	48	40	36	30	24	18
9	22½	54	45	40½	33¾	27	20¼
10	25	60	50	45	37½	30	22½
11	27½	66	55	49½	41¼	33	24¾
12	30	72	60	54	45	36	27
13	32½	78	65	58½	48¾	39	29¼
14	35	84	70	63	52½	42	31½
15	37½	90	75	67½	56¼	45	33¾
16	40	96	80	72	60	48	36
17	42½	102	85	76½	63¾	51	38¼
18	45	108	90	81	67½	54	40½
19	47½	114	95	85½	71¼	57	42¾
20	50	120	100	90	75	60	45
21	52½	126	105	94½	78¾	63	47¼
22	55	132	110	99	82½	66	49½
23	57½	138	115	103½	86¼	69	51¾
24	60	144	120	108	90	72	54
25	62½	150	125	112½	93¾	75	56¼
26	65	156	130	117	97½	78	58¾
27	67½	162	135	121½	101¼	81	60¾
28	70	168	140	126	105	84	63
29	72½	174	145	130½	108¾	87	65¼
30	75	180	150	135	112½	90	67½
31	77½	186	155	139½	116¼	93	69¾
32	80	192	160	144	120	96	72

Above Radiators are tapped 2 inches and bushed as per list on page 112.

Distance from floor to center of tapping is 4½ inches for both Steam and Water.

\* In estimating *length* of Radiator allow ½ inch for each bushing.

### Special Tappings

These Radiators when specially ordered can be tapped as illustrated on page 111. When so tapped the distance between centers of upper and lower tappings is - in the 44-inch Height, 35 $\frac{9}{16}$  inches; 38-inch Height, 31 $\frac{1}{8}$  inches; 32-inch Height, 25 $\frac{9}{16}$  inches; 26-inch Height, 19½ inches; 22-inch Height, 15 $\frac{3}{8}$  inches; 18-inch Height, 11 $\frac{3}{8}$  inches.



# Rococo Four-Column Orna. Radiators

For Steam or Water



Each section is 10½ inches wide.

Width of legs, 11¼ inches.

Connected at top and bottom with extra-heavy slip nipples.

This pattern of Radiators is not made in any special or odd shapes, other than that same can be furnished with Saddles for Marble Top; see page 108.



# Rococo Four-Column Orna. Radiators

For Steam or Water

No. of Sections	*Length 3 in. per Sec.	HEATING SURFACE—SQUARE FEET.					
		45-in. Height. 10 sq. ft. per Sec.	38-in. Height. 8 sq. ft. per Sec.	32-in. Height. 6½ sq. ft. per Sec.	26-in. Height. 5 sq. ft. per Sec.	22-in. Height. 4 sq. ft. per Sec.	18-in. Height. 3 sq. ft. per Sec.
2	6	20	16	13	10	8	6
3	9	30	24	19½	15	12	9
4	12	40	32	26	20	16	12
5	15	50	40	32½	25	20	15
6	18	60	48	39	30	24	18
7	21	70	56	45½	35	28	21
8	24	80	64	52	40	32	24
9	27	90	72	58½	45	36	27
10	30	100	80	65	50	40	30
11	33	110	88	71½	55	44	33
12	36	120	96	78	60	48	36
13	39	130	104	84½	65	52	39
14	42	140	112	91	70	56	42
15	45	150	120	97½	75	60	45
16	48	160	128	104	80	64	48
17	51	170	136	110½	85	68	51
18	54	180	144	117	90	72	54
19	57	190	152	123½	95	76	57
20	60	200	160	130	100	80	60
21	63	210	168	136½	105	84	63
22	66	220	176	143	110	88	66
23	69	230	184	149½	115	92	69
24	72	240	192	156	120	96	72
25	75	250	200	162½	125	100	75
26	78	260	208	169	130	104	78
27	81	270	216	175½	135	108	81
28	84	280	224	182	140	112	84
29	87	290	232	188½	145	116	87
30	90	300	240	195	150	120	90
31	93	310	248	201½	155	124	93
32	96	320	256	208	160	128	96

Above Radiators are tapped 2 inches and bushed as per list on page 112.

Distance from floor to center of tapping, either supply or return, 4½ inches.

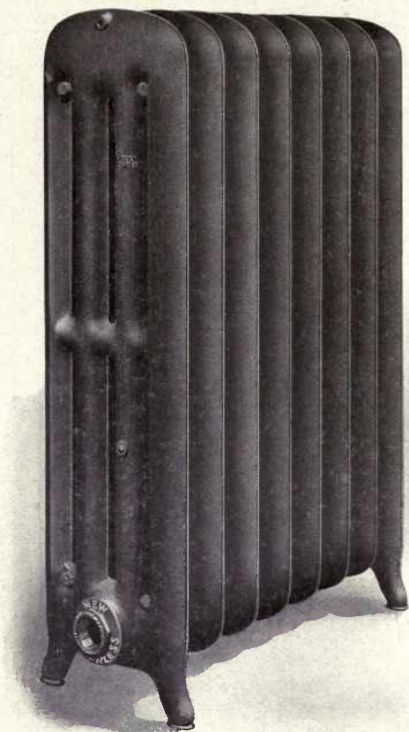
\*In estimating *length* of Radiator, allow ½ inch for each bushing.

## Special Tappings

These Radiators when specially ordered can be tapped as illustrated on page 111. When so tapped the distance between centers of upper and lower tappings is—45-inch, 38½ inches; 38-inch, 31⅞ inches; 32-inch, 25⅞ inches; 26-inch, 19½ inches; 22-inch, 15⅞ inches; 18-inch, 11⅞ inches.

# Peerless Four-Column Radiators

For Steam or Water



Each section is  $10\frac{1}{2}$  inches wide.

Width of legs,  $11\frac{1}{4}$  inches.

Connected at top and bottom with extra-heavy slip nipples,

This pattern of Radiators is not made in any special or odd shapes, other than that same can be furnished with Saddles for Marble Top; see page 108.

# Peerless Four-Column Radiators

For Steam or Water

No. of Sections	*Length 3 in. per Sec.	HEATING SURFACE—SQUARE FEET					
		45-in. Height 10 sq. ft. per Sec.	38 in. Height 8 sq. ft. per Sec.	32-in. Height 6½ sq. ft. per Sec.	26 in. Height 5 sq. ft. per Sec.	22-in. Height. 4 sq. ft. per Sec.	18-in. Height. 3 sq. ft. per Sec.
2	6	20	16	13	10	8	6
3	9	30	24	19½	15	12	9
4	12	40	32	26	20	16	12
5	15	50	40	32½	25	20	15
6	18	60	48	39	30	24	18
7	21	70	56	45½	35	28	21
8	24	80	64	52	40	32	24
9	27	90	72	58½	45	36	27
10	30	100	80	65	50	40	30
11	33	110	88	71½	55	44	33
12	36	120	96	78	60	48	36
13	39	130	104	84½	65	52	39
14	42	140	112	91	70	56	42
15	45	150	120	97½	75	60	45
16	48	160	128	104	80	64	48
17	51	170	136	110½	85	68	51
18	54	180	144	117	90	72	54
19	57	190	152	123½	95	76	57
20	60	200	160	130	100	80	60
21	63	210	168	136½	105	84	63
22	66	220	176	143	110	88	66
23	69	230	184	149½	115	92	69
24	72	240	192	156	120	96	72
25	75	250	200	162½	125	100	75
26	78	260	208	169	130	104	78
27	81	270	216	175½	135	108	81
28	84	280	224	182	140	112	84
29	87	290	232	188½	145	116	87
30	90	300	240	195	150	120	90
31	93	310	248	201½	155	124	93
32	96	320	256	208	160	128	96

Above Radiators are tapped 2 inches and bushed as per list on page 112.

Distance from floor to center of tapping, either supply or return, 4½ inches.

\* In estimating *length* of Radiator, allow ½ inch for each bushing.

## Special Tappings

These Radiators when specially ordered can be tapped as illustrated on page 111. When so tapped the distance between centers of upper and lower tappings is—45-inch, 38½ inches; 38-inch, 31½ inches; 32-inch, 25½ inches; 26-inch, 19½ inches; 22-inch, 15½ inches; 18-inch, 11½ inches.

# Italian Flue Ornamental Radiators

For Steam and Water



Patented October 20, 1896

Each section is  $8\frac{1}{2}$  inches wide.

Width of legs,  $8\frac{1}{2}$  inches.

Connected with extra-heavy right- and left-hand threaded nipples.

For two-pipe Steam work the supply leg-section is constructed with low-drip hub.

Italian Flue Radiators are made in special shapes as follows:

Corner, for Steam and Water .....see pages 102 to 104  
Curved, for Steam and Water .....see page 105  
Legs, Detachable, High, for Steam and Water .....see page 107  
Marble-Tops, Lugs for, for Steam and Water .....see page 108

# Italian Flue Ornamental Radiators

For Steam and Water

Number of Sections	*Length, 3 in. per Section	HEATING SURFACE—SQUARE FEET.			
		38-in. Height. 7 sq. ft. per Section.	32-in. Height. 5¾ sq. ft. per Section.	26 in. Height. 4½ sq. ft. per Section.	20-in. Height. 3¾ sq. ft. per Section.
2	6	14	11½	9	6½
3	9	21	17¼	13½	9¾
4	12	28	23	18	13
5	15	35	28¾	22½	16¼
6	18	42	34½	27	19½
7	21	49	40¾	31½	22¾
8	24	56	46	36	26
9	27	63	51¾	40½	29¼
10	30	70	57½	45	32½
11	33	77	63¾	49½	35¾
12	36	84	69	54	39
13	39	91	74¾	58½	42¼
14	42	98	80½	63	45½
15	45	105	86¼	67½	48¾
16	48	112	92	72	52
17	51	119	97¾	76½	55¼
18	54	126	103½	81	58½
19	57	133	109¼	85½	61¾
20	60	140	115	90	65
21	63	147	120¾	94½	68¾
22	66	154	126½	99	71½
23	69	161	132¼	103½	74¾
24	72	168	138	108	78
25	75	175	143¾	112½	81¼
26	78	182	149½	117	84½
27	81	189	155¼	121½	87¾
28	84	196	161	126	91
29	87	203	166¾	130½	94¼
30	90	210	172½	135	97½
31	93	217	178¼	139½	100¾
32	96	224	184	144	104

Above Radiators are tapped 2 inches, and bushed as per list on page 112.

Distance from floor to center of supply tapping: single-pipe Steam, 4 inches; double-pipe Steam 4½ inches supply, 4 inches return; Water, 4½ inches supply and return.

\*In estimating *length* of Radiators allow ½ inch for each bushing.

Leg section of Italian Flue Water Radiator has plug at top, which can be taken out to make top connection when desired. Distance between centers of upper and lower tapings is—in the 38-inch Height, 31½ inches; 32-inch Height, 25½ inches; 26-inch Height, 19½ inches; 20-inch Height, 13½ inches.



# Zenith Flue Radiators

For Steam and Water



Each section is  $8\frac{1}{2}$  inches wide.

Width of legs,  $9\frac{1}{2}$  inches.

Connected with extra-heavy slip-nipples, at both top and bottom, for Water; extra-heavy right-hand threaded nipple for Steam.

Zenith Flue Radiators are not made in any special or odd shapes, other than that they can be furnished with Extra High Solid Legs; see page 108.

For two-pipe Steam work the supply-leg section is constructed with low-drip hub.



# Zenith Flue Radiators

For Steam and Water

No. of Sections	*Length Inches	HEATING SURFACE—SQUARE FEET			
		38 in. Height. 7 sq. ft. per Sec.	33-in. Height. 6 sq. ft. per Sec.	28-in. Height 5 sq. ft. per Sec.	23-in. Height. 4 sq. ft. per Sec.
2	4 $\frac{3}{4}$	14	12	10	8
3	7 $\frac{3}{8}$	21	18	15	12
4	10 $\frac{1}{8}$	28	24	20	16
5	12 $\frac{3}{4}$	35	30	25	20
6	15 $\frac{1}{2}$	42	36	30	24
7	18 $\frac{1}{8}$	49	42	35	28
8	20 $\frac{7}{8}$	56	48	40	32
9	23 $\frac{1}{2}$	63	54	45	36
10	26 $\frac{1}{4}$	70	60	50	40
11	29	77	66	55	44
12	31 $\frac{3}{4}$	84	72	60	48
13	34 $\frac{1}{4}$	91	78	65	52
14	37	98	84	70	56
15	39 $\frac{3}{4}$	105	90	75	60
16	42 $\frac{3}{8}$	112	96	80	64
17	45	119	102	85	68
18	47 $\frac{3}{4}$	126	108	90	72
19	50 $\frac{1}{2}$	133	114	95	76
20	53 $\frac{1}{4}$	140	120	100	80
21	55 $\frac{7}{8}$	147	126	105	84
22	58 $\frac{5}{8}$	154	132	110	88
23	61 $\frac{1}{4}$	161	138	115	92
24	64	168	144	120	96
25	66 $\frac{3}{4}$	175	150	125	100
26	69 $\frac{1}{2}$	182	156	130	104
27	72 $\frac{1}{4}$	189	162	135	108
28	75	196	168	140	112
29	77 $\frac{3}{4}$	203	174	145	116
30	80 $\frac{1}{2}$	210	180	150	120
31	83 $\frac{1}{4}$	217	186	155	124
32	86	224	192	160	128

Above Radiators are tapped 2 inches, and bushed as per list on page 112.

Distance from floor to center of tapping, single-pipe Steam, 4 $\frac{1}{4}$  inches; double-pipe Steam supply, 4 $\frac{3}{4}$  inches, return, 4 $\frac{1}{4}$  inches; Water, supply and return, 4 $\frac{3}{4}$  inches.

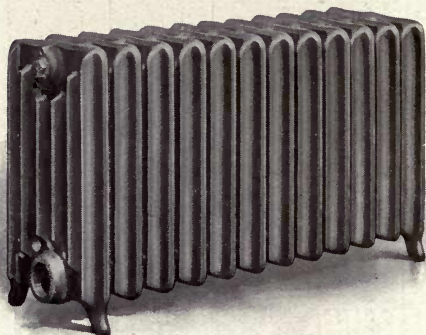
\*In estimating *length* of Radiators allow  $\frac{1}{2}$  inch for each bushing.

## Special Tappings

In Zenith Flue Water Radiators (when so specially ordered) distance between centers of upper and lower tapings is—in the 38-inch Height, 31 inches; 33-inch Height, 26 inches; 28-inch Height, 20 $\frac{7}{8}$  inches; 23-inch Height, 16 inches.

# Rococo Window Radiators

For Steam or Water



No. of Sections.	*Length, 3 inches per Section.	HEATING SURFACE—SQUARE FEET.	
		20-in. Height. 5 ft. per Section.	13-in. Height. 3 ft. per Section.
2	6	10	6
3	9	15	9
4	12	20	12
5	15	25	15
6	18	30	18
7	21	35	21
8	24	40	24
9	27	45	27
10	30	50	30

Can be built up like all AMERICAN Radiators to any practical greater number of sections. Tapped 2 inches, and bushed as per list on page 112.

Each section is  $12\frac{1}{2}$  inches wide. Floor to center of all tappings 3 inches.

Steam Radiators tapped  $1\frac{1}{2}$  inch or smaller are fitted with eccentric bushings on supply end for single-pipe, and on return end for double-pipe; then, the distance from floor to center of  $1\frac{1}{2}$ -inch tapping will be  $2\frac{3}{8}$  inches;  $1\frac{1}{4}$ -inch tapping,  $2\frac{3}{4}$  inches; 1-inch tapping,  $2\frac{5}{8}$  inches;  $\frac{3}{4}$ -inch tapping,  $2\frac{1}{2}$  inches.

\* In estimating *length* of Radiators, allow  $\frac{1}{2}$  inch for each bushing.

As made at Detroit Plant these Radiators are connected with extra-heavy right- and left-hand threaded nipples.

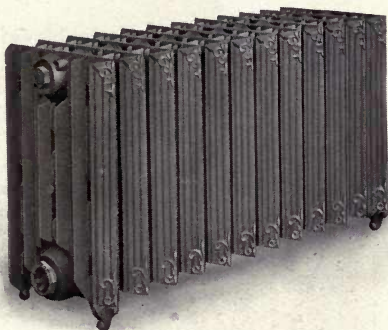
Top of each leg section has plug which can be taken out to make top connection when desired—distance between centers of upper and lower tappings is—in the 20-inch Height,  $15\frac{1}{8}$  inches; 13-inch Height,  $8\frac{1}{8}$  inches.



View of End Section

# Aetna Flue Window Radiators

For Steam or Water



No. of Sections	*Length, 3 inches per Sec.	HEATING SURFACE—SQUARE FEET				
		20-in. Height. 6 sq. ft. per Sec.	18-in. Height. 5½ sq. ft. per Sec.	16-in. Height. 4½ sq. ft. per Sec.	14-in. Height. 4 sq. ft. per Sec.	13-in. Height. 3½ sq. ft. per Sec.
2	6	12	10⅔	9⅓	8	7⅓
3	9	18	16	14	12	11
4	12	24	21⅓	18⅓	16	14⅓
5	15	30	26⅓	23⅓	20	18⅓
6	18	36	32	28	24	22
7	21	42	37⅓	32⅓	28	25⅓
8	24	48	42⅓	37⅓	32	29⅓
9	27	54	48	42	36	33
10	30	60	53⅓	46⅓	40	36⅓
11	33	66	58⅓	51⅓	44	40⅓
12	36	72	64	56	48	44
13	39	78	69⅓	60⅓	52	47⅓
14	42	84	74⅓	65⅓	56	51⅓
15	45	90	80	70	60	55

Can be built up, like all AMERICAN Radiators, to any practical greater number of sections.

For Aetna Curved and Corner Radiators, see pages 102 to 104.

Above Radiators are tapped 2 inches, and bushed as per list on page 112.

Each section is 12½ inches wide.

Distance from floor to center of tapping: Single-pipe Steam, 2½ inches; double-pipe Steam, 3 inches supply, 2½ inches return; Water, supply and return, 3 inches. For two-pipe Steam work the supply-leg section is constructed with low-drip hub.

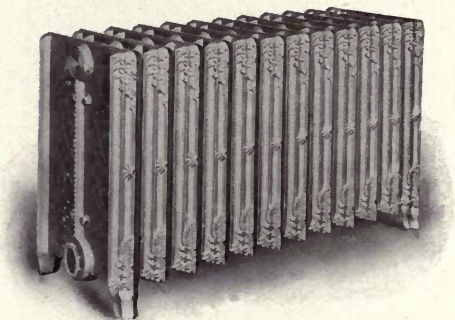
\* In estimating length of Radiator allow ½ inch for each bushing.

Connected with extra-heavy right- and left-hand threaded nipples.

Top of each leg section has 1½ inch plug, which can be taken out to make top connection when desired. In Aetna Flue (formerly Detroit Flue) Water Radiators, distance between centers of upper and lower tappings is—in the 20-inch Height, 15⅓ inches; 18-inch Height, 13⅓ inches; 16-inch Height, 11¼ inches; 14-inch Height, 9⅓ inches; 13-inch Height, 8¼ inches.

# Zenith Window Flue Radiators

For Steam or Water



No. of Sections	*Length, inches	HEATING SURFACE—SQUARE FEET			
		20-in. Height. 6 sq. ft. per Sec.	18-in. Height. 5½ sq. ft. per Sec.	16-in. Height. 4¾ sq. ft. per Sec.	14-in. Height. 4 sq. ft. per Sec.
2	5¼	12	10¾	9 ⅓	8
3	8¼	18	16	14	12
4	11¼	24	21¾	18¾	16
5	14¼	30	26¾	23¾	20
6	17¼	36	32	28	24
7	20¼	42	37¾	32¾	28
8	23¼	48	42¾	37¾	32
9	26¼	54	48	42	36
10	29¼	60	53¾	46¾	40
11	32¼	66	58¾	51¾	44
12	35¼	72	64	56	48
13	38¼	78	69¾	60¾	52
14	41¼	84	74¾	65¾	56

Can be built up, like all AMERICAN Radiators, to any practical greater number of sections.

Above Radiators are tapped 2 inches and bushed, as per list on page 112  
Each section is 12½ inches wide. Width at legs, 12¾ inches.

Distance from floor to center of openings for either supply or return, Steam or Water, is 3 inches.

Connected with extra heavy slip nipples at top and bottom.

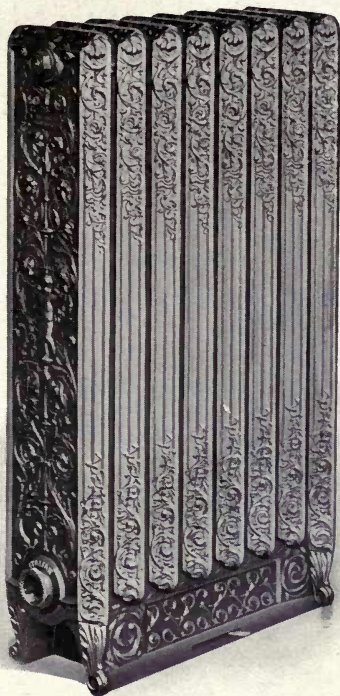
Distance between centers of upper and lower tapings (when specially ordered) is—in the 20-inch Height, 15¾ inches; 18-inch Height, 13¾ inches.

This Radiator can be furnished with Saddles for Marble Top, see page 108

\*In estimating length of Radiator allow ½ inch for each bushing. In estimating length of Radiators larger than 14 sections, multiply the number of inside sections by 3 inches, and then add 5¼ inches for the two end sections

# Italian Orna. Flue Ventilating Radiators

For Steam and Water



Each section is 8½ inches wide.

Connected with extra-heavy right- and left-hand threaded nipples.

This pattern of Radiator is not made in any special or odd shape, as the Box-Bases can only be made in straight form.

For two-pipe Steam work the supply-leg section is constructed with low-drip hub.

*In ordering please state whether back or bottom inlet is required.*



# Italian Orna. Flue Ventilating Radiators

For Steam and Water

No. of Sections	*Length 3 inches per Sec.	HEATING SURFACE—SQUARE FEET			
		39½-in. Height. 7 sq. ft. per Sec.	33½-in. Height. 5¾ sq. ft. per Sec.	27½-in. Height. 4½ sq. ft. per Sec.	21½-in. Height. 3¼ sq. ft. per Sec.
2	6	14	11½	9	6½
3	9	21	17¼	13½	9¾
4	12	28	23	18	13
5	15	35	28¾	22½	16¼
6	18	42	34½	27	19½
7	21	49	40¼	31½	22¾
8	24	56	46	36	26
9	27	63	51¾	40½	29¼
10	30	70	57½	45	32½
11	33	77	63¼	49½	35¾
12	36	84	69	54	39
13	39	91	74¾	58½	42¼
14	42	98	80½	63	45½
15	45	105	86¼	67½	48¾
16	48	112	92	72	52
17	51	119	97¾	76½	55¼
18	54	126	103½	81	58½
19	57	133	109¼	85½	61¾
20	60	140	115	90	65
21	63	147	120¾	94½	68¼
22	66	154	126½	99	71½
23	69	161	132¼	103½	74¾
24	72	168	138	108	78
25	75	175	143¾	112½	81¼

Above Radiators are tapped 2 inches, and bushed as per list on page 112.

Distance from floor to center of tapping: one-pipe Steam, 5½ inches; two-pipe Steam, supply, 6 inches, return 5½ inches; Water, supply and return, 6 inches.

Top of each Water leg has 1½-inch plug, which can be taken out to make top connection when desired; distance between centers of upper and lower tapplings is—in the 39½-inch Height, 31½ inches; 33½-inch Height, 25½ inches; 27½-inch Height, 19½ inches; 21½-inch Height, 13½ inches.

\* In estimating *length* of Radiator, allow ½ inch for each bushing.



# Italian Flue Ventilating Radiators

Attention is invited to the merits of our Italian Flue Radiator, equipped with Box-Base, for semi-direct heating

Principle of construction of Base is such that all the air required for ventilation may be taken from without the building by means of air conduit in wall, and distributed through Base into the interior or flue surface of radiator. When outdoor temperature is very low, dampers in Base may be adjusted

to any smaller air capacity desired, regulating exactly the varying heating and ventilating requirements of the room, or dampers may be entirely closed, the radiator then acting wholly as a direct radiator.

Leading features of the Box-Base are simplicity of construction, ease of operation, capacity for ample supply of air. Base being wholly under the radiator, well recessed, is entirely out of the way and not liable to damage. Front of Base, including dampers, may be easily removed for cleaning purposes. Dampers may be operated merely by slight pressure of the foot.

Air Conduit.—Fig. A shows view of radiator

and Box-Base with air conduit brought up underneath radiator, through floor. Illustration on page 86 shows Box-Base as arranged for bringing air conduit in at back of radiator, above floor level, in which case a galvanized or sheet-iron sleeve or conduit is necessary to make connection between flange or collar cast around back air inlet of Base and a similar collar on back of wall box.

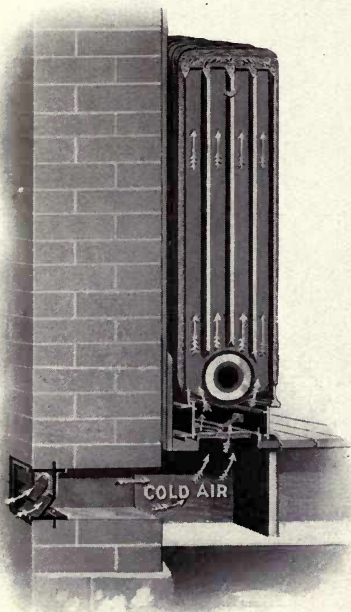


FIG. A

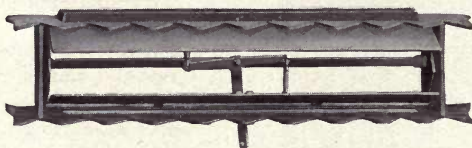
# Italian Flue Box-Bases



Showing Rear Half of Box-Base and Dampers.  
Back Air-Inlet Closed.  
(*Patent applied for.*)

Outside measurements of flange or lip around back air-inlet of Box Base, for attaching sheet-iron sleeve or pipe, are:

No.	Base Section	Inches	No.	Base Section	Inches
B-1	12	24 $\frac{1}{4}$ x 3 $\frac{1}{4}$	B-6	7	11 $\frac{7}{8}$ x 3 $\frac{1}{4}$
B-3	11	21 $\frac{1}{4}$ x 3 $\frac{1}{4}$	B-7	6	9 x 3 $\frac{1}{4}$
B-3	10	18 $\frac{1}{4}$ x 3 $\frac{1}{4}$	B-8	5	6 x 3 $\frac{1}{4}$
B-4	9	15 $\frac{1}{4}$ x 3 $\frac{1}{4}$	B-9	4	5 $\frac{5}{8}$ x 3 $\frac{1}{4}$
B-5	8	14 $\frac{1}{4}$ x 3 $\frac{1}{4}$	B-10	3	2 $\frac{1}{4}$ x 3 $\frac{1}{4}$



Box-Base, showing Operation of Dampers.  
1 or Bottom Air-Inlet.  
(*Patent applied for.*)

Where air conduit is brought up through floor, under radiator, the opening in floor to be covered by dampers in Base should be:

No.	Base Section	Inches	No.	Base Section	Inches
F-1	12	24 $\frac{1}{8}$ x 3 $\frac{3}{8}$	F-6	7	11 $\frac{5}{8}$ x 3 $\frac{3}{8}$
F-2	11	21 $\frac{1}{8}$ x 3 $\frac{3}{8}$	F-7	6	8 $\frac{1}{2}$ x 3 $\frac{3}{8}$
F-3	10	18 x 3 $\frac{3}{8}$	F-8	5	6 $\frac{1}{8}$ x 3 $\frac{1}{2}$
F-4	9	15 $\frac{1}{8}$ x 3 $\frac{3}{8}$	F-9	4	5 $\frac{1}{2}$ x 3 $\frac{1}{2}$
F-5	8	14 $\frac{3}{8}$ x 3 $\frac{3}{8}$	F-10	3	3 $\frac{1}{4}$ x 3 $\frac{1}{2}$

NOTE.—12-Section Box-Base is to be used for radiator of twelve sections, or any EVEN number of sections larger. 11-Section Box-Base for radiator of eleven sections, or any ODD number of sections larger. Bottom of back air-inlet opening is one inch above floor level. In ordering Box-Bases to be placed in middle of long Radiators, note that, for instance, to cover six flues or middle sections requires an 8-section Base, to cover seven flues or middle sections requires 9-section Base, etc.

# Zenith Flue Ventilating Radiators

For Steam and Water



Each section is  $8\frac{1}{2}$  inches wide.

Width of legs,  $9\frac{1}{2}$  inches.

Connected with extra-heavy slip-nipples, at both top and bottom, for Water; extra-heavy right-hand threaded nipple, for Steam. For two-pipe Steam work the supply-leg section is constructed with low-drip hub.

Zenith Flue Ventilating Radiators are not made in any special or odd shapes.

*In ordering please state whether back or bottom inlet is required.*

# Zenith Flue Ventilating Radiators

For Steam and Water

No. of Sections	*Length Inches	HEATING SURFACE—SQUARE FEET			
		38 in. Height. 7 sq. ft. per Sec.	33-in. Height. 6 sq. ft. per Sec.	28-in. Height. 5 sq. ft. per Sec.	23-in. Height. 4 sq. ft. per Sec.
2	4 $\frac{3}{4}$	14	12	10	8
3	7 $\frac{3}{8}$	21	18	15	12
4	10 $\frac{1}{8}$	28	24	20	16
5	12 $\frac{3}{4}$	35	30	25	20
6	15 $\frac{1}{2}$	42	36	30	24
7	18 $\frac{1}{8}$	49	42	35	28
8	20 $\frac{7}{8}$	56	48	40	32
9	23 $\frac{1}{2}$	63	54	45	36
10	26 $\frac{1}{4}$	70	60	50	40
11	29	77	66	55	44
12	31 $\frac{3}{4}$	84	72	60	48
13	34 $\frac{1}{4}$	91	78	65	52
14	37	98	84	70	56
15	39 $\frac{3}{4}$	105	90	75	60
16	42 $\frac{3}{8}$	112	96	80	64
17	45	119	102	85	68
18	47 $\frac{3}{4}$	126	108	90	72
19	50 $\frac{1}{2}$	133	114	95	76
20	53 $\frac{1}{4}$	140	120	100	80
21	55 $\frac{7}{8}$	147	126	105	84
22	58 $\frac{5}{8}$	154	132	110	88
23	61 $\frac{1}{4}$	161	138	115	92
24	64	168	144	120	96
25	66 $\frac{3}{4}$	175	150	125	100
26	69 $\frac{1}{2}$	182	156	130	104
27	72 $\frac{1}{4}$	189	162	135	108
28	75	196	168	140	112
29	77 $\frac{3}{4}$	203	174	145	116
30	80 $\frac{1}{2}$	210	180	150	120
31	83 $\frac{1}{4}$	217	186	155	124
32	86	224	192	160	128

Above Radiators are tapped 2 inches, and bushed as per list on page 112.

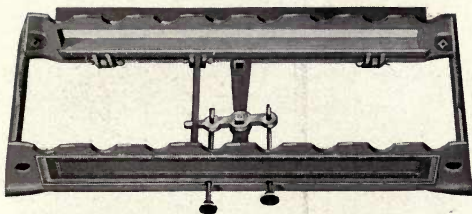
Distance from floor to center of tapping, single-pipe Steam, 4 $\frac{1}{4}$  inches; double-pipe Steam, supply, 4 $\frac{3}{4}$  inches, return, 4 $\frac{1}{4}$  inches; Water, supply and return, 4 $\frac{3}{4}$  inches.

\* In estimating *length* of Radiators allow  $\frac{1}{2}$  inch for each bushing.

## Special Tappings

In Zenith Flue Water Radiators (when so specially ordered) distance between centers of upper and lowerappings is—in the 38-inch Height, 31 inches; 33-inch Height, 26 inches; 28-inch Height, 20 $\frac{7}{8}$  inches; 23-inch Height, 16 inches.

# Zenith Flue Box-Bases



Box-Base, showing Dampers.

Outside dimensions of flange or lip around back air inlet of Box-Base for attaching sheet-iron sleeve or pipe:

No.	Base Section	Inches	No.	Base Section	Inches
B-1	12	$2\frac{3}{4} \times 24\frac{3}{4}$	B-6	7	$2\frac{3}{4} \times 11\frac{3}{8}$
B-2	11	$2\frac{3}{4} \times 22\frac{1}{8}$	B-7	6	$2\frac{3}{4} \times 8\frac{1}{8}$
B-3	10	$2\frac{3}{4} \times 19\frac{5}{8}$	B-8	5	$2\frac{3}{4} \times 7\frac{1}{8}$
B-4	9	$2\frac{3}{4} \times 16\frac{5}{8}$	B-9	4	$2\frac{3}{4} \times 4\frac{3}{4}$
B-5	8	$2\frac{3}{4} \times 14$			

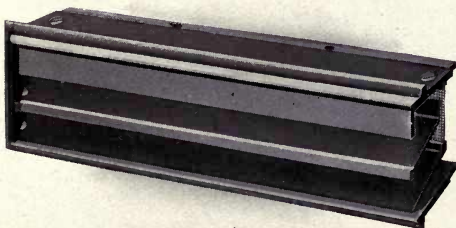
Bottom of back air inlet opening is  $\frac{1}{2}$  inch above floor level.

Where cold-air inlet is brought up through floor, under radiator, the opening in floor to be covered by dampers in base should be:

No.	Base Section	Inches	No.	Base Section	Inches
F-1	12	$4 \times 23\frac{3}{4}$	F-6	7	$4 \times 10\frac{1}{2}$
F-2	11	$4 \times 21$	F-7	6	$4 \times 7\frac{1}{2}$
F-3	10	$4 \times 18\frac{1}{4}$	F-8	5	$4 \times 6$
F-4	9	$4 \times 15\frac{1}{2}$	F-9	4	$4 \times 3\frac{1}{2}$
F-5	8	$4 \times 13$			

See note at foot of page 86

## Wall Boxes



These are substantially constructed; and their angle slats and inside brass-wire screen render them storm and insect proof. Outside measurement of Wall Box is  $5 \times 17\frac{1}{2}$  inches, to conform with brick measure. The outside measurement of the flange is  $4\frac{3}{4} \times 17$  inches.



# Areal Sanitary Ventilating Radiators

For Steam Only



	No. 10	No. 15
Total Height of Radiator and Base . . . . .	30 $\frac{1}{8}$ inches	30 $\frac{1}{8}$ inches
Length over all " " " . . . . .	*29 $\frac{1}{4}$ "	*44 $\frac{1}{4}$ "
Width of Panel . . . . .	12 $\frac{1}{2}$ "	12 $\frac{1}{2}$ "
" " Base at floor line . . . . .	12 "	12 "
Heating Surface . . . . .	80 sq. ft.	120 sq. ft.
Depth of Lip on back of Base . . . . .	1 $\frac{1}{4}$ inches	1 $\frac{1}{4}$ inches
Length of Lip, outside measurement . . . . .	24 "	40 $\frac{1}{2}$ "
Width of Lip, outside measurement . . . . .	6 $\frac{3}{8}$ "	6 $\frac{3}{8}$ "
Number of square inches in Air opening		
i. e., inside measurement of Back opening . . . . .	23 $\frac{1}{2}$ x6 "	40x6 "

Above Radiators are tapped 2 inches and bushed, as per list on page 112.  
Distance from floor to center of supply tapping is 9 inches, return 8 $\frac{1}{2}$  inches.

For two-pipe Steam work the supply-leg section is constructed with low-drip hub.

\* In estimating *length* of Radiator allow  $\frac{1}{2}$  inch for each bushing.



# Ventilating Radiators

With New Adjustable Box-Base



**Front View—Rococo Three-Column Orna. Radiator**

This improved Ventilating Base for AMERICAN Radiators is made in portable form as illustrated in detail view shown on page 93. This base can be easily adjusted under Radiators carried in regular warehouse stocks as herewith listed, without waiting for special sections, or without making any changes to the Radiator itself.

Engineers and Heating Contractors will appreciate the convenience arising from being able to specify and secure AMERICAN Direct-Indirect Radiation in the patterns mentioned from warehouse stocks, without waiting for the execution of special orders.

The bases and plates for both bottom opening and front and back opening box-bases are made for Rococo One-, Two-, Three- and Four-Column; Peerless One-, Two-, Three- and Four-Column; National Two-Column Radiators.

# Ventilating Radiators

## With New Adjustable Box-Base



Rear View—Rococo Three-Column Ornate Radiator

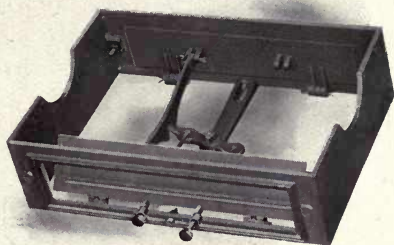
The Bases and corresponding front and back plates are regularly made in eleven sizes to supply air circulation to Radiators of from five to fifteen sections of the Radiators named on page 91. They fit under regular stock Radiators of more than five sections and with reference to amount of air supply required rather than full size of Radiator. Thus a 5-section Box-Base can be adjusted to a Radiator of 7, 9 sections or larger (in odd sections); a 10-section Box-Base fits a Radiator of 12 sections or larger (in even sections), and so on. A detailed view of Base appears on next page.

The two plates which are adjusted to the front and back of the Radiator on top of the Base are held in place by bolts running through the center or corners of the plates, which can be readily removed for cleaning.

# Ventilating Radiators

With New Adjustable Box Base

This portable interchangeable Base is compact and fits under the Radiator snugly; the dampers work with reversible action, so that when the inside inlet is open the outside damper in the front of the Base is closed and vice versa. The Base can be furnished with either an opening and damper in the back (as shown in above cut) or in the floor under the Radiator, as may be desired.



Front View—with Rear Wall Collar and Damper

These Box Bases are made at Pierce Plant only. Orders

should always stipulate whether the bases are desired with regular inlet collar in the rear as above shown, or for inlet to come through the floor.

## Single-Column Bases

No.	Base Section	Inches	No.	Base Section	Inches
B-1-1	15	30 <sup>1</sup> / <sub>16</sub> x 2 <sup>1</sup> / <sub>3</sub>	B-1- 7	9	15 <sup>1</sup> / <sub>32</sub> x 2 <sup>1</sup> / <sub>3</sub>
B-1-2	14	27 <sup>3</sup> / <sub>32</sub> x 2 <sup>1</sup> / <sub>3</sub>	B-1- 8	8	12 <sup>3</sup> / <sub>32</sub> x 2 <sup>1</sup> / <sub>3</sub>
B-1-3	13	25 <sup>5</sup> / <sub>16</sub> x 2 <sup>1</sup> / <sub>3</sub>	B-1- 9	7	10 <sup>9</sup> / <sub>16</sub> x 2 <sup>1</sup> / <sub>3</sub>
B-1-4	12	22 <sup>3</sup> / <sub>32</sub> x 2 <sup>1</sup> / <sub>3</sub>	B-1-10	6	7 <sup>9</sup> / <sub>16</sub> x 2 <sup>1</sup> / <sub>3</sub>
B-1-5	11	20 <sup>5</sup> / <sub>32</sub> x 2 <sup>1</sup> / <sub>3</sub>	B-1-11	5	5 <sup>3</sup> / <sub>16</sub> x 2 <sup>1</sup> / <sub>3</sub>
B-1-6	10	17 <sup>1</sup> / <sub>16</sub> x 2 <sup>1</sup> / <sub>3</sub>			

## Two-Column Bases

B-2-1	15	30 <sup>1</sup> / <sub>16</sub> x 2 <sup>1</sup> / <sub>3</sub>	B-2- 7	9	15 <sup>7</sup> / <sub>32</sub> x 2 <sup>1</sup> / <sub>3</sub>
B-2-2	14	27 <sup>3</sup> / <sub>32</sub> x 2 <sup>1</sup> / <sub>3</sub>	B-2- 8	8	12 <sup>3</sup> / <sub>32</sub> x 2 <sup>1</sup> / <sub>3</sub>
B-2-3	13	25 <sup>3</sup> / <sub>16</sub> x 2 <sup>1</sup> / <sub>3</sub>	B-2- 9	7	10 <sup>3</sup> / <sub>32</sub> x 2 <sup>1</sup> / <sub>3</sub>
B-2-4	12	22 <sup>3</sup> / <sub>32</sub> x 2 <sup>1</sup> / <sub>3</sub>	B-2-10	6	7 <sup>9</sup> / <sub>16</sub> x 2 <sup>1</sup> / <sub>3</sub>
B-2-5	11	20 <sup>5</sup> / <sub>32</sub> x 2 <sup>1</sup> / <sub>3</sub>	B-2-11	5	5 <sup>1</sup> / <sub>16</sub> x 2 <sup>1</sup> / <sub>3</sub>
B-2-6	10	17 <sup>3</sup> / <sub>32</sub> x 2 <sup>1</sup> / <sub>3</sub>			

## Three-Column Bases

B-3-1	15	30 <sup>1</sup> / <sub>16</sub> x 2 <sup>1</sup> / <sub>3</sub>	B-3- 7	9	15 <sup>7</sup> / <sub>32</sub> x 2 <sup>1</sup> / <sub>3</sub>
B-3-2	14	27 <sup>3</sup> / <sub>32</sub> x 2 <sup>1</sup> / <sub>3</sub>	B-3- 8	8	12 <sup>3</sup> / <sub>32</sub> x 2 <sup>1</sup> / <sub>3</sub>
B-3-3	13	25 <sup>3</sup> / <sub>16</sub> x 2 <sup>1</sup> / <sub>3</sub>	B-3- 9	7	10 <sup>3</sup> / <sub>32</sub> x 2 <sup>1</sup> / <sub>3</sub>
B-3-4	12	22 <sup>3</sup> / <sub>32</sub> x 2 <sup>1</sup> / <sub>3</sub>	B-3-10	6	7 <sup>9</sup> / <sub>16</sub> x 2 <sup>1</sup> / <sub>3</sub>
B-3-5	11	20 <sup>5</sup> / <sub>32</sub> x 2 <sup>1</sup> / <sub>3</sub>	B-3-11	5	5 <sup>9</sup> / <sub>16</sub> x 2 <sup>1</sup> / <sub>3</sub>
B-3-6	10	17 <sup>1</sup> / <sub>16</sub> x 2 <sup>1</sup> / <sub>3</sub>			

## Four-Column Bases

B-4-1	15	36 <sup>9</sup> / <sub>16</sub> x 2 <sup>2</sup> / <sub>3</sub>	B-4- 7	9	18 <sup>3</sup> / <sub>32</sub> x 2 <sup>2</sup> / <sub>3</sub>
B-4-2	14	33 <sup>9</sup> / <sub>16</sub> x 2 <sup>2</sup> / <sub>3</sub>	B-4- 8	8	15 <sup>3</sup> / <sub>32</sub> x 2 <sup>2</sup> / <sub>3</sub>
B-4-3	13	30 <sup>9</sup> / <sub>16</sub> x 2 <sup>2</sup> / <sub>3</sub>	B-4- 9	7	12 <sup>3</sup> / <sub>32</sub> x 2 <sup>2</sup> / <sub>3</sub>
B-4-4	12	27 <sup>9</sup> / <sub>16</sub> x 2 <sup>2</sup> / <sub>3</sub>	B-4-10	6	9 <sup>3</sup> / <sub>16</sub> x 2 <sup>2</sup> / <sub>3</sub>
B-4-5	11	24 <sup>9</sup> / <sub>16</sub> x 2 <sup>2</sup> / <sub>3</sub>	B-4-11	5	6 <sup>3</sup> / <sub>16</sub> x 2 <sup>2</sup> / <sub>3</sub>
B-4-6	10	21 <sup>1</sup> / <sub>16</sub> x 2 <sup>2</sup> / <sub>3</sub>			

# Rococo Dining-Room Radiators

Made in 44-Inch Height Only, Steam and Water



Number	*Length inches	Heating Surface square feet	Number	*Length inches	Heating Surface square feet
† 1	22½	43½	5	42½	91½
2	27½	55½	6	47½	103½
3	32½	67½	7	52½	115½
4	37½	79½	8	57½	127½

† No. 1 is not made in Water pattern.

These Radiators are tapped 2 inches and bushed as per list on page 112. Oven has two shelves 17¼ inches long, 10½ inches wide, with 5 inches space between. Doors are stenciled "R" for Right; "L" for Left—for correct assembling.

The outside width of oven is 12 inches, and this fact should be borne in mind by fitters when arranging for connections, so that distance from center of tapping to wall shall not be less than 6 inches.

\*In estimating *length*, allow ½ inch for each bushing.

# Perfection Dining-Room Radiators

Made in 38-inch Height only. Steam only.



Number	*Length, inches	Heating Surface, square feet	Number	*Length, inches	Heating Surface, square feet
00	25	13	4	50	53
0	30	21	5	55	61
1	35	29	6	60	69
2	40	37	7	65	77
3	45	45			

Above Radiators are tapped  $1\frac{1}{2}$  inches and bushed as per list on page 112

In upper portion of oven are 2 shelves each  $20\frac{3}{4}$  inches long, 13 inches wide, 9 inches space between. In lower portion 1 shelf of same measurement.

The outside width of oven is  $13\frac{5}{8}$  inches, and this fact should be borne in mind by fitters when arranging for connections, so that distance from center of tapping to wall shall not be less than  $6\frac{1}{8}$  inches.

Distance from floor to center of tapping,  $4\frac{1}{2}$  inches.

\*In estimating length allow  $\frac{1}{2}$ -inch for each bushing.



# Detroit Ornamental Fluted Dining-Room Radiators

Made in 38-inch Height only, Steam and Water



Number	*Length, inches	Heating Surface, square feet	Number	*Length, inches	Heating Surface, square feet
1	30 $\frac{1}{8}$	33 $\frac{1}{2}$	6	53 $\frac{3}{8}$	76 $\frac{3}{4}$
2	34 $\frac{1}{8}$	42	7	57 $\frac{3}{8}$	85 $\frac{1}{2}$
3	39 $\frac{5}{8}$	50 $\frac{3}{4}$	8	62 $\frac{7}{8}$	94
4	43 $\frac{1}{8}$	59 $\frac{1}{2}$	9	67 $\frac{1}{8}$	102 $\frac{3}{4}$
5	48 $\frac{3}{8}$	68	10	71 $\frac{1}{8}$	111 $\frac{1}{2}$

Above Radiators are tapped 2 inches and bushed according to list on page 112.

Oven has three shelves or racks each 25 $\frac{1}{2}$  inches long, 12 $\frac{3}{8}$  inches wide, with 8 $\frac{3}{4}$  inches spaces between.

Outside or extreme depth of oven or closet is 13 inches, which fact should be borne in mind by fitters when arranging for connections, so that distance from wall to center of tapping shall not be less than 6 $\frac{1}{2}$  inches.

Distance from floor to center of tapping is 4 $\frac{1}{2}$  inches for Water Radiators; 4 inches for one-pipe Steam Radiators; 4 $\frac{1}{2}$  inches for supply and 4 inches for return on two-pipe Steam Radiators.

For two-pipe Steam work the supply-leg section is constructed with low-drip hub.

\* In estimating length allow  $\frac{1}{2}$  inch for each bushing.



# Colonial Pantry Radiators

For Steam or Water



This Radiator and Plate-warmer combined is made up from Colonial Sections (7-foot only)—for either steam or water

It is not only very handy for residence pantries, but in extended constructions this warmer will be found most adaptable to the needs of hotel and restaurant kitchens wherein it is necessary to keep a large number of plates and other dishes warm and ready for service. It can be made up in various heights. It is shipped made up.

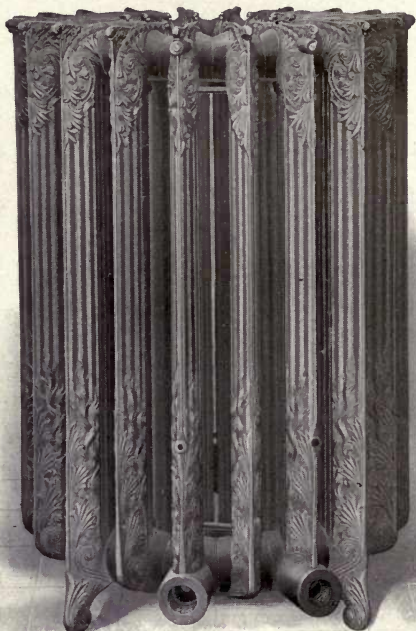
## Measurements

No.	Heights Inches	Heating Surface	List Price
1	7	7 sq. ft.	\$ 8 00
2	17	15 "	15 00
3	27	23 "	22 00
4	37	30 "	29 00

Length . . . . . 23 inches  
 Width . . . . . 13¼ "  
 Height, floor to bottom of lower section . . . 4 "

In ordering, state whether for Steam or Water, and what size tapping is required.

# Circular Radiators



**Detroit Ornamental Fluted Wide-Top Circular**

Circular Radiators are made in all heights of following patterns:

\* Detroit Ornamental Fluted Wide-Top (made in 38-inch Height only, and carried regularly in stock).

National Single-Column (steam only).

National Two-Column (steam only).

Peerless Single-Column (steam only).

Peerless Two-Column (steam only).

Perfection (steam only).

Rococo Three-Column.

For measurements, see pages 99, 100, and 101

\* See Note, page 99.

## Circular Radiators—Continued

### Detroit Ornamental Fluted Wide Top

#### Steam or Water

In 38-inch height only.

Number	Sections	Heating Surface square feet	Outside Diameter at Legs	Inside Diameter at Legs	List Price
1	12	52	22	3 $\frac{3}{4}$	\$26 00
2	16	69	25	7	34 00
3	20	87	27	9	44 00
4	24	104	29	11	52 00
5	28	121	31	13	60 00
6	32	139	34	16	70 00
7	36	156	38	20	78 00

Distance from floor to center of tapping, 3 $\frac{3}{4}$  inches.

These Radiators will all be built in halves, and are provided with bolts for holding halves together. Each half is provided with one feed and one return tapping on opposite sides. Openings are all right hand, tapped two inches and bushed according to tapping list on page 112

In order to give more space for adjusting valves the sections of *all* Circular, Steam and Water Radiators having supply and return openings are separated by an intermediate section without tapping boss.

One piece Circulars are not supplied for one-pipe Steam, as the drainage would be unsatisfactory.

Radiators can be made to work as one radiator, single-pipe system, by use of elbows and tee. Radiators are of the Water pattern, but will be fitted with Steam and Water air vent openings.

These Circular Radiators can, *on special order*, be fitted with lugs for marble tops.

*NOTE.*—We regularly carry a stock of the above pattern of Circular Radiators, without lugs, at our Detroit plant and can ship promptly, tapped for either Steam or Water.

## Circular Radiators—Continued

ROCOCO STEAM AND WATER			PERFECTION STEAM		
No. of Sections	Outside Diameter at Legs	Inside Diameter at Legs	No. of Sections	Outside Diameter at Legs	Inside Diameter at Legs
12	27 $\frac{1}{4}$	5 $\frac{3}{4}$	16	25 $\frac{3}{4}$	5 $\frac{3}{4}$
14	28	6 $\frac{1}{2}$	18	27 $\frac{1}{4}$	7 $\frac{1}{4}$
16	29 $\frac{1}{4}$	7 $\frac{3}{4}$	20	28 $\frac{3}{4}$	8 $\frac{3}{4}$
18	30	8 $\frac{1}{2}$	22	30 $\frac{1}{2}$	10 $\frac{1}{2}$
20	31	9 $\frac{1}{2}$	24	32 $\frac{1}{4}$	12 $\frac{1}{4}$
22	32	10 $\frac{1}{2}$	26	32 $\frac{3}{4}$	12 $\frac{3}{4}$
24	33	11 $\frac{1}{2}$	28	33 $\frac{3}{4}$	13 $\frac{3}{4}$
26	33 $\frac{1}{2}$	12	30	33 $\frac{3}{4}$	13 $\frac{3}{4}$
28	34	12 $\frac{1}{2}$	32	36 $\frac{1}{4}$	16 $\frac{1}{4}$
30	36	14 $\frac{1}{2}$	34	38 $\frac{1}{2}$	18 $\frac{1}{2}$
32	36 $\frac{1}{2}$	15	36	39 $\frac{1}{2}$	19 $\frac{1}{2}$
34	37 $\frac{1}{2}$	16	38	40 $\frac{1}{2}$	20 $\frac{1}{2}$
36	38 $\frac{1}{2}$	17	40	41 $\frac{3}{4}$	21 $\frac{3}{4}$
38	39 $\frac{1}{2}$	18	44	43 $\frac{3}{4}$	23 $\frac{3}{4}$
40	41	19 $\frac{1}{2}$	46	46 $\frac{1}{4}$	26 $\frac{1}{4}$
44	43 $\frac{1}{2}$	22	50	49 $\frac{1}{4}$	29 $\frac{1}{4}$
46	46	24 $\frac{1}{2}$	60	55 $\frac{1}{4}$	35 $\frac{1}{4}$
50	48 $\frac{1}{2}$	27			

Rococo Circular Radiators are made in Three-Column patterns only, in heights as listed on page 67; Perfection Circular in heights as listed on page 57.

Rococo Circular Radiators are tapped 2 inches, and bushed as per list on page 112. Perfection Circular Radiators are tapped solid two inches as per list on page 112.

Rococo Circular Radiators are furnished in *two pieces*, forming two separate and distinct Radiators, which are simply bolted together and can be taken apart, placed around a column and again bolted together. For one-pipe work this radiator has two tapplings for valves; for two-pipe work and for Water, it has four tapplings for valves—two supply in front and two return in back.

When above Circular Radiators (for Steam only) are not intended to be placed around a column or post, they can, when specially ordered, be furnished all in *one piece*, having two connections for valves for two-pipe work. One piece Circular Radiators are not supplied for one-pipe steam, as the drainage would be unsatisfactory. All Circular Water Radiators are made in *two pieces*.

In order to give more space for adjusting valves the sections of *all* Circular Steam and Water Radiators having supply and return openings are separated by an intermediate section without tapping boss.

Distance from floor to center of either supply or return tapping in Rococo and Perfection Circular Radiator is 4 inches.

NOTE.—Circular Radiators can be made to work as one radiator, single-pipe system, by use of elbows and tee.

# Circular Radiators—Continued

National and Peerless, for Steam only

NATIONAL TWO-COLUMN AND PEERLESS TWO-COLUMN STEAM			NATIONAL AND PEERLESS SINGLE-COLUMN STEAM		
No. of Sections	Outside Diameter at Legs	Inside Diameter at Legs	No. of Sections	Outside Diameter at Legs	Inside Diameter at Legs
16	23 $\frac{1}{8}$	6 $\frac{1}{8}$	16	20 $\frac{1}{8}$	9 $\frac{1}{8}$
20	25 $\frac{7}{8}$	8 $\frac{7}{8}$	20	22 $\frac{7}{8}$	11 $\frac{7}{8}$
24	28 $\frac{3}{4}$	11 $\frac{3}{4}$	24	25 $\frac{3}{4}$	14 $\frac{3}{4}$
25	29 $\frac{3}{8}$	12 $\frac{3}{8}$	25	26 $\frac{3}{8}$	15 $\frac{3}{8}$
28	31 $\frac{1}{2}$	14 $\frac{1}{2}$	28	28 $\frac{1}{2}$	17 $\frac{1}{2}$
30	32 $\frac{7}{8}$	15 $\frac{7}{8}$	30	29 $\frac{7}{8}$	18 $\frac{7}{8}$
32	34 $\frac{1}{4}$	17 $\frac{1}{4}$	32	31 $\frac{1}{4}$	20 $\frac{1}{4}$
33	35	18	33	32	21
36	37 $\frac{1}{16}$	20 $\frac{1}{16}$	36	34 $\frac{1}{16}$	23 $\frac{1}{16}$
38	38 $\frac{7}{16}$	21 $\frac{7}{16}$	38	35 $\frac{7}{16}$	24 $\frac{7}{16}$
40	39 $\frac{7}{8}$	22 $\frac{7}{8}$	40	36 $\frac{7}{8}$	25 $\frac{7}{8}$
44	42 $\frac{5}{8}$	25 $\frac{5}{8}$	44	39 $\frac{5}{8}$	28 $\frac{5}{8}$
50	46 $\frac{3}{4}$	29 $\frac{3}{4}$	50	43 $\frac{3}{4}$	32 $\frac{3}{4}$

Made in all heights, as listed on pages, 47, 51, 59, and 63.

Above Circular Radiators are tapped *solid* 1  $\frac{1}{2}$  inches, or smaller, as per list on page 112.

Circular Radiators for one-pipe work are practically two separate radiators; they are not joined at the back. They can be made to work as one radiator on single-pipe system by use of elbows and tee.

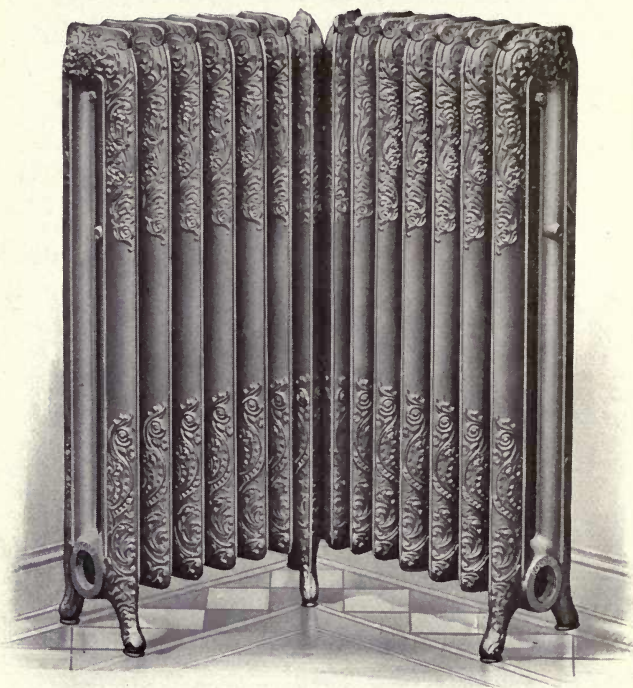
When for two-pipe work, they are joined at the back with special nipple; both supply and return being at the front, and the supply tapping being at right-hand as you face the radiator.

In order to give more space for adjusting valves the sections of *all* these Circular Steam Radiators having supply and return openings are separated by an intermediate section without tapping boss.

Distance from the floor to the center of either supply or return tapping is 4  $\frac{1}{2}$  inches.



## Corner Radiators



Rococo Two-Column

Corner Radiators are made in all heights of the following patterns:

Aetna Flue.

Italian Flue.

Peerless Single-Column (steam only).

Peerless Two-Column (steam only).

Perfection (steam only).

Rococo Two-Column (water, Detroit Plant); (steam, Pierce Plant).

Rococo Three-Column Orna. and Plain (Detroit Plant only).

Verona.



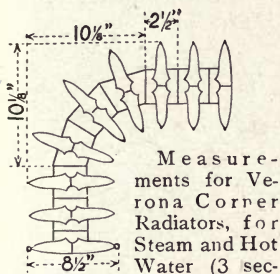
# Corner Radiator Measurements

In ordering Corner Radiators give number of sections in corner and number of sections in each arm, also state which arm, looking into the corner, has the supply leg.

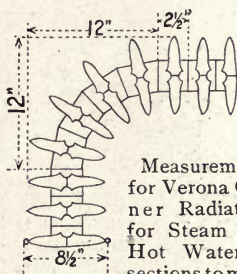
For ordering Corner or Curved Radiators, see page 220.

In all heights of Curved and Corner Steam Radiators, owing to the difference in heights of supply and return end tappings from floor, we must know (by sketch) which end of radiator is for supply and which for return, as you face the inside of angle or curve.

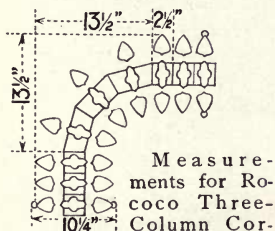
In estimating *length* of Radiators allow  $\frac{1}{2}$  inch for each bushing.



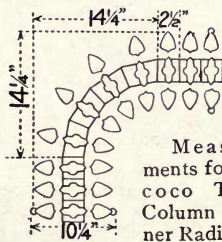
Measurements for Verona Corner Radiators, for Steam and Hot Water (3 sections to make corner). For heights and heating surfaces of sections, see page 53.



Measurements for Verona Corner Radiators, for Steam and Hot Water (4 sections to make corner). For heights and heating surfaces of sections, see page 53.

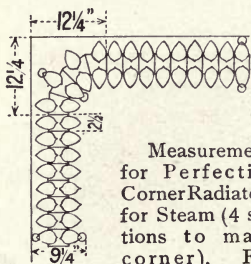


Measurements for Rocco Three-Column Corner Radiators, for Steam and Water (3 sections to make corner). For heights and heating surfaces of sections, see page 67.

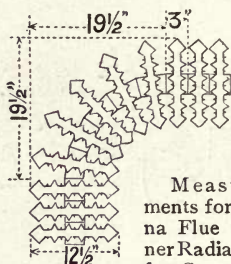


Measurements for Rocco Three-Column Corner Radiators, for Steam and Water (4 sections to make corner). For heights and heating surfaces of sections, see page 67.

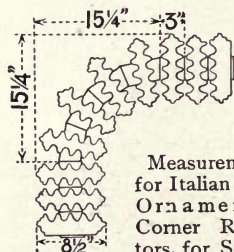
# Corner Radiator Measurements—Continued



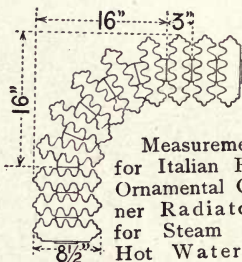
Measurements for Perfection Corner Radiators, for Steam (4 sections to make corner). For heights and heating surfaces of sections, see pages 57 and 61.



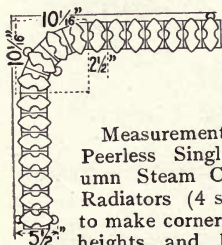
Measurements for Aetna Flue Corner Radiators, for Steam or Hot Water (5 sections to make corner). For heights and heating surfaces of sections, see page 81.



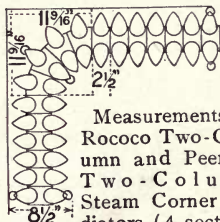
Measurements for Italian Flue Ornamental Corner Radiators, for Steam and Hot Water (4 sections to make corner). For heights and heating surfaces of sections, see page 77.



Measurements for Italian Flue Ornamental Corner Radiators, for Steam and Hot Water (5 sections to make corner). For heights and heating surfaces of sections, see page 77.

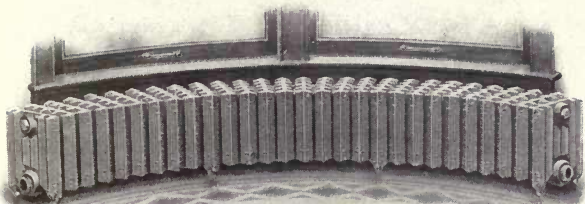


Measurements for Peerless Single-Column Steam Corner Radiators (4 sections to make corner). For heights and heating surfaces of sections, see pages 47 and 51.

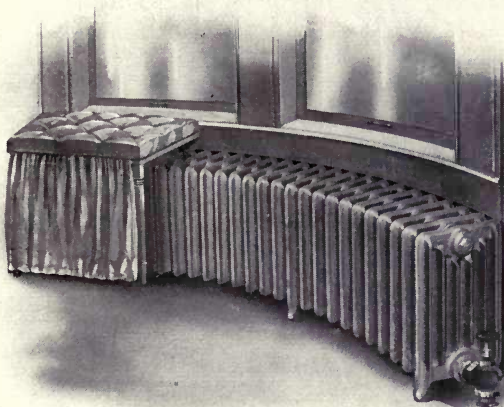


Measurements for Rococo Two-Column and Peerless Two-Column Steam Corner Radiators (4 sections to make corner). For heights and heating surfaces of sections, see pages 59 and 63.

# Curved Radiators



**Aetna Flue Curved Radiator**



**Rococo Curved Window Radiator**

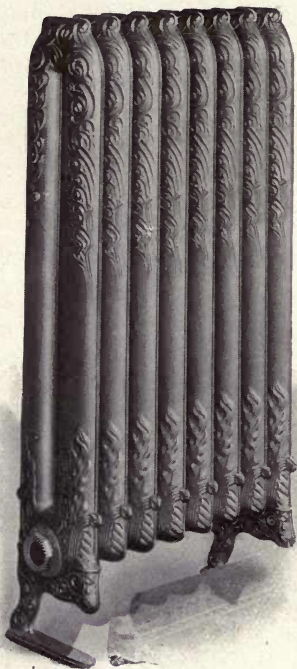
Curved Radiators are made in all heights of patterns as follows:

Aetna Flue.	Peerless Two-Column (steam only).
Italian Flue.	Perfection (steam only).
National Single-Column (steam only).	Rococo Three Col. Orna. and Plain.
National Two-Column (steam only).	Rococo Window.
Peerless Single-Column (steam only).	Verona.

**NOTE.**—In ordering Curved or Corner Radiators, specify the exact radius or angle of the base-board within which the radiator is to be placed. For method of arriving at exact radius or angle, see drawings and instructions on pages 220 to 222.

*It is important that a heavy paper template showing exact size and radius of each curved radiator shall accompany the order.*

## Carpet-Foot Radiators



Perfection Ornamental Carpet Feet

Furnished for all heights of Perfection Steam Radiators. Carpet feet increase distance from floor to center of supply tapping to  $6\frac{1}{2}$  inches for single-pipe Steam; supply 7 inches, return  $6\frac{1}{2}$  inches, for double-pipe Steam; made in Steam only.

Also furnished for all heights of DETROIT PLANT ROCOCO Three-Column Radiators for Steam and Water; distance from floor to center of single-pipe Steam tapping, 5 inches; for two-pipe Steam,  $5\frac{1}{2}$  inches supply, 5 inches return; for Water,  $5\frac{1}{2}$  inches, either supply or return. For two-pipe Steam work the Supply-Leg Section is constructed with low-drip hub.

# Detachable High Legs

(Patent applied for)

As shown on this page are made, upon special order, for all heights of Italian Flue (without Box Bases), Verona, Perfection, and Rococo Ornamental and Plain Radiators.

For Rococo Window Radiators these legs are furnished in one height only;  $7\frac{1}{2}$  inches from floor to center of hub.

These legs can be furnished so that the distance from floor to center of supply tapplings for one-pipe job will be six or eight inches as ordered.

The Ætna Flue Radiators can also be furnished with Detachable High Legs, to make distance from floor to center of supply tapping for one-pipe job, six or eight inches as ordered.

If any other distances from floor to center of tapping are absolutely required they can be furnished on special order only.

These legs are detached and shipped separately, thus removing possibility of breakage.

The size of each pair of Detachable Legs is cut on the inside of each half, as " $4 \times 4\frac{1}{2}$ ." These numbers show the distance which the legs will bring the center of the tapping from floor. For example, the  $4 \times 4\frac{1}{2}$  legs are the standard height legs and bring both tapplings of a Water Radiator  $4\frac{1}{2}$  inches from floor; in a double-pipe steam job, the supply would be  $4\frac{1}{2}$  inches and the return 4 inches from floor; in a single-pipe steam job the supply or low drip end would be 4 inches from the floor.

In ordering radiators having Detachable Legs, always give distance from floor to center of what is to be the supply tapping of radiator; and when for Steam Radiators, be sure to state whether for one or two-pipe job.



## Extra-High Solid Legs



Extra-High Solid Legs, as shown by illustration on this page, can be furnished on special order only, in all heights, except 44-inch and 45-inch sections, of

National.....	1-Column
National.....	2-Column
Peerless.....	1-Column
Peerless.....	2-Column
Peerless.....	3-Column
Peerless.....	4-Column
Rococo.....	1-Column
Rococo.....	2-Column
Rococo.....	3-Column
Zenith.....	
Zenith Window.....	

so that distance from floor to center of tapping will be 6, or 8 inches, as ordered. If high solid legs are required for Rococo 4-Column, all heights, or 44-inch and 45-inch heights of all other patterns, inquire what heights can be furnished.

Other distances, if absolutely required, furnished on special order only.

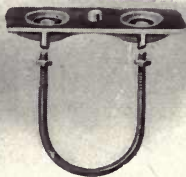
These Radiators with Extra-High Solid Legs are tapped 2 inches and bushed according to list on page 112.

NOTE—In ordering Radiators having extra-high solid legs, always give distance required from floor to the center of what is to be the supply tapping of Radiator; and when for Steam, be sure to state whether for one- or

two-pipe work.

## Saddles for Marble Tops

For List of Marble Tops and Slabs, see page 175.



Saddle for Steam Radiator

Saddle for Hot-Water Radiator

These Saddles fit Radiators of following patterns:

National Single-Column

Peerless Two-Column

National Two-Column

Peerless Three-Column

Peerless Single-Column

Peerless Four-Column

Rococo Ornamental

They afford a rest or support upon which marble tops can be placed. Two of these saddles are usually sufficient for a radiator, but in the case of a radiator of 15 sections or more it is advisable to use three saddles—one in the center and one at either end.

We are also prepared to furnish cast-iron Saddles for Zenith Window Flue Radiators.

## Lugs for Marble Tops

The following patterns are, when so specially ordered, arranged with lugs on top of leg sections for holding marble tops:

Italian Flue  
Perfection

Rococo (Detroit Plant)  
Verona



## Radiator Pedestals



Made at Detroit Plant

### Made at Pierce Plant

Pedestals to fit under legs of all styles and heights of any of our Direct

Radiators can be furnished in the following heights:  $\frac{1}{2}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{4}$ ,  $1\frac{1}{2}$ ,  $1\frac{3}{4}$ , 2,  $2\frac{1}{4}$ ,  $2\frac{1}{2}$ , 3,  $3\frac{1}{2}$ , 4,  $4\frac{1}{2}$ , 5, 6, 7, 8 and 9 inches.



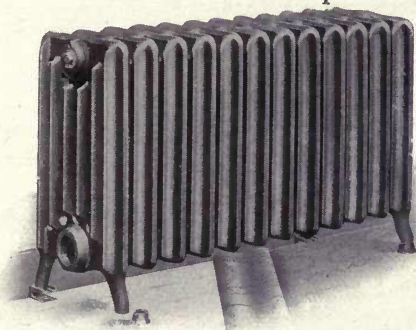
Made at Pierce Plant

### Made at Detroit Plant

Pedestals to fit under legs of all styles and heights of any of our Direct Radiators can be furnished in the following heights:  $\frac{1}{2}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{4}$ ,  $1\frac{1}{2}$ ,  $1\frac{3}{4}$ , 2,  $2\frac{1}{4}$ ,  $2\frac{1}{2}$ , 3,  $3\frac{1}{2}$ , 4,  $4\frac{1}{2}$ , 5,  $5\frac{1}{2}$ , 6,  $6\frac{1}{2}$ , 7,  $7\frac{1}{2}$ , 8,  $8\frac{1}{2}$  and 9 inches.

Heights  $\frac{1}{2}$  to  $2\frac{1}{2}$  inches inclusive, are made in the same pattern as the Pierce-Plant pedestal.

## Radiator Foot-Ups



View of a new Radiator "Foot-up," showing its application to a low Radiator, and illustrating the method of taking up a carpet without changing anything but one of the Foot-ups at a time. The advantages of these little conveniences are as follows: Very neat in appearance; easily adjusted; save time and money; do away with radiator boards; save cutting carpet or displacing the radiator to take up the carpet. These Foot-ups set the radiator up *from floor*  $1\frac{1}{8}$  inches. List prices: Two pieces to a set; plain, 25 cts. per set; nicked, 40 cts. per set.

# Radiator Wrenches



## Direct Radiator Wrench

On the inside of each right- and left-hand threaded nipple, as furnished with radiators made at our DETROIT PLANT, are cast two heavy projecting lugs, so that an ordinary piece of bar iron flattened at one end, the length of nipple, can be inserted to any desired point in the radiator, and by applying wrench to bar the nipple can be unscrewed and one or more sections may be taken out independent of all the others in the stack. Made in two sizes, for 1½-inch and 2-inch nipples.



## Indirect Radiator Wrench

These drop-forged steel wrenches are made especially for assembling Indirect Radiators connected with right- and left-hand threaded nipple having hexagon nut at center. Made in two sizes, for 1½- and 2-inch nipple openings.



## Vento Nipple Wrench

For Vento sections this wrench will be found most practical. Made of drop-forged steel, for right- and left-hand threaded nipples having a hexagon nut at the center. It has a 3-inch opening to engage the nut of a 2½-inch nipple and is strong and durable.

# Concealed Brackets

For supporting Single, Two-Column, Three-Column, and Four-Column Direct Radiators of patterns made by us. Distance from wall to center of tapping in radiator is—in the Single-Column, 3 inches; Two-Column, 5 inches; Three-Column, 5¼ inches; Four-Column, 6½ inches. A set consists of one each, top and bottom support. Ordinarily two sets will support a medium size of radiator. Concealed Brackets are also made for Perfection, Rococo, Two-Column and Rococo Three-Column Direct Radiators,

Top Guide

Bottom Support

both Steam and Water, made at DETROIT PLANT. Distance from wall to center of tapping in radiator is—in Two-Column, 4⅞ inches; Three-Column, 5⅞ inches.

# Special Direct Radiator Tappings



Top and bottom tappings, same end, for water.

While it has been our practice heretofore to furnish certain patterns of slip-nipple radiation regularly tapped as illustrated, hereafter such construction will not be so tapped unless *specially noted on order*. On right- and left-nipple construction Water Radiators will be furnished with plug at top of each end section, as heretofore. This plug can be removed and bushing for pipe connection inserted if necessary.

## Instructions for Assembling American Radiators

1. Wipe the nipple clean and inspect it carefully, to be sure that it has no defects which would affect the making of a tight joint.

2. Wipe the opening in the Radiator loop clean, to remove iron chips or dirt.

If threaded see that there is no dirt in threads.

3. Paint the opening in the loop with Frazer's Pipe Joint Paste, or with a mixture made up of one-half red lead and one-half white lead, thinned with boiled linseed oil to the consistency of liquid paint.

4. In slip-nipple work insert the nipple in one loop by hand as far as it will go, taking great care to see that the nipple is straight. If the nipple is cocked, a perfect joint cannot be made and the section is put under a strain which is liable to break it.

5. In right and left internal screwed nipple Water Radiators see that the top and bottom nipples start at the same time, and also that they enter both loops evenly so that one-half of each nipple will be in each loop when assembled. The two nipples should make up evenly. An asbestos gasket, provided for this purpose, should always be used.

6. In assembling right and left hexagon nipples, start the right-hand thread (on the long side of the nipple) one turn before engaging the left-hand thread.

# Tapping List of Direct Radiators

## STEAM

### ONE-PIPE WORK

Radiators containing 24 square feet and under . . . . .	1	inch
Above 24, but not exceeding 60 feet . . . . .	1¼	inch
Above 60, but not exceeding 100 feet . . . . .	1½	inch
Above 100 square feet . . . . .	2	inch

### TWO-PIPE WORK

Radiators containing 48 square feet and under . . . . .	1	x	¾	inch
Above 48, but not exceeding 96 feet . . . . .	1¼	x	1	inch
Above 96 square feet . . . . .	1½	x	1¼	inch

## WATER

### TAPPED FOR SUPPLY AND RETURN

Radiators containing 40 square feet and under . . . . .	1	inch
Above 40, but not exceeding 72 square feet . . . . .	1¼	inch
Above 72 square feet . . . . .	1½	inch

Vapor tapplings, top and bottom opposite ends, supply ¾ inches, return ½ inch.

Unless otherwise ordered, all openings of Direct Radiators will have right-hand threads (except that of Wall Radiators where tapped 1½ inch, in which case tapping at one end is right-hand and left-hand on other end).

All air-valve tapplings of Direct Radiators are regularly made ⅝ inch.

## Measurements of American Radiators

Width, Inches		Name of Radiator	Length occupied in Stack by each Section* Inches
Legs	Intermediate Sections	Directs	
12½	12½	Aetna Flue . . . . .	3
12	12	Areal . . . . .	
8½	7¾	Astro . . . . .	3
8½	8½	Italian Flue . . . . .	3
5½	4½	National Single-Column . . . . .	2½
8½	7¾	National Two-Column . . . . .	2½
5½	4½	Peerless Single-Column . . . . .	2½
8½	7¾	Peerless Two-Column . . . . .	2½
10	9	Peerless Three-Column . . . . .	2½
11¼	10½	Peerless Four-Column . . . . .	3
9¼	7¼	Perfection . . . . .	2½
5½	4½	Rococo Single-Column . . . . .	2½
8½	7¾	Rococo Two-Column . . . . .	2½
10	9¼	Rococo Three-Column . . . . .	2½
11	10½	Rococo Four-Column . . . . .	3
12½	12½	Rococo Window . . . . .	3
8½	8	Verona . . . . .	2½
9½	8½	Zenith Flue . . . . .	
12¾	12½	Zenith Window . . . . .	

\* To length of these Radiators add ½ inch for each bushing.

# American Radiator Bushing System



## Hot Water

Distance from floor to center of either supply or return tapping is  $4\frac{1}{2}$  inches. (See note.)

It is often necessary to change the tappings of Direct Radiators after they are ordered and received at the building. Sometimes a direct radiator is changed from one room to another in which the piping connection or valve may be larger or smaller; or a room may be altered in size and more sections added to the radiator or some taken off, which will require the changing the size of the supply pipe to conform to the new heating requirements. Therefore, to facilitate any changes which may develop, all AMERICAN Direct Radiators (except as stated in note) are tapped two inches and bushed as specified on page 112.

This system makes it easy to make alterations at any time without the re-tapping and re-threading of the end sections that would be necessary in radiation having solid tappings.

Few fitters are equipped to re-tap and re-thread a section on the job. It usually goes to the machine shop or a new one is ordered. Our system saves this expense and loss of time, always providing a basis for variable, yet reliable piping connections. The highly perfected machinery employed for tapping and for making our bushings which is owned exclusively by this Company insures a uniformity in tight joints.



## Single-Pipe Steam

Distance from floor to center of tapping is 4 inches. (See note.)

For Steam Radiators double tappings can be changed to single tapping by the use of a plug in the supply end of the radiator. On the other hand, Steam Radiators connected up to single-pipe work can be changed to double piping by replacing the plug on the return end with a bushing. Both supply and return legs have air-valve tappings with interchangeable plugs.

In ordering legs or end sections, specify if for supply or return and whether for single or double-pipe work.



## Double-Pipe Steam

Distance from floor to center of supply tapping is  $4\frac{1}{2}$  inches; return 4 inches. (See note.)

## Exceptions

NOTE—This system does not apply to National Circular, Perfection Circular, Peerless Circular. It does not apply to National and Peerless Single-Column for Steam, with regular legs; but with High Solid Legs it does apply.



# Classification of Radiator Sections

We herewith publish a classification and naming of direct radiator sections which will give all concerned a more definite method of naming sections when writing out orders.

If the following terms are used in making out orders, their use will insure a definite understanding of requirements at our Branches and Plants, and thus save correspondence and insure prompt shipments of small parts ordered.

**"Supply Leg"**—To designate end sections connected to supply pipe for two-pipe Steam system.

End section on slip-nipple radiation connected to supply pipe for Water system.

End section on right- and left-hand threaded nipple construction radiation fitted with left-hand thread for nipple.

**"Return Leg"**—To designate end section on slip-nipple construction radiation connected to return pipe for Water system.

End section on right- and left-hand threaded nipple construction radiation fitted with right-hand threads for nipple.

**"Drip Leg"**—To designate end section connected to return pipe on a two-pipe Steam system. On right- and left-hand threaded nipple construction radiation this section is fitted with right-hand thread for nipple.

End section connected to piping system on a one-pipe system. On right- and left-hand threaded nipple construction radiation this section is fitted with right-hand thread for nipple.

**"Blank Leg"**—To designate end section on a one-pipe system not connected to piping system. On right- and left-hand threaded nipple construction radiation this section is fitted with left-hand thread for nipple.

**"Center Leg"**—To designate intermediate or middle section furnished with feet.

**"Loop"**—To designate intermediate or middle section.

## Water Radiation for Steam

**"Supply Leg"**—On all water for steam right- and left-hand threaded nipple construction radiation, excepting Ætna Flue, is fitted with left-hand thread for nipple, regardless of one- or two-pipe system.

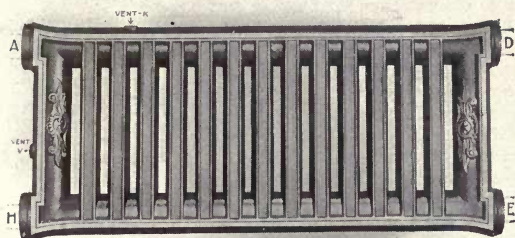
**"Return Leg"**—On all water for steam, right- and left-hand threaded nipple construction radiation, excepting Ætna Flue, is fitted with right-hand thread for nipple, regardless of one- or two-pipe system.

**NOTE**—It is always advisable in ordering sections for Steam Radiators to state whether for one- or two-pipe connections.

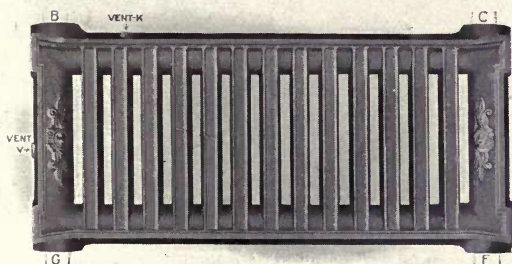


# Rococo Wall Radiators

For Steam or Water



Horizontal Section



Vertical Section

Rococo Wall Radiator sections are made for two methods of interconnection as follows: The vertical section is tapped on the long sides at B, C, G, and F; the horizontal section is tapped on the short sides at A, H, D, and E. A, B, C, and H are right-hand tapplings; D, E, F, and G are left-hand tapplings.

When more than 4 tapplings are required in one section an extra charge is made for the extra tapplings, at 10 cents each, net.

For measurements and method of assembling and erecting, see pages 211 to 218.

## Size and Measurements

Made in three sizes,  $2\frac{3}{8}$  in. thick, or  $3\frac{1}{2}$  in. with bracket.

Extra large,  $29\frac{1}{8}$  in. long,  $13\frac{5}{8}$  in. wide—9 sq. ft.

Standard,  $21\frac{7}{8}$  in. long,  $13\frac{5}{8}$  in. wide—7 sq. ft.

Small,  $16\frac{5}{8}$  in. long,  $13\frac{5}{8}$  in. wide—5 sq. ft.

## Assembling Wall Sections

Connected with  $1\frac{1}{2}$ -inch right- and left-hand internal nipples.

On the inside of each of these right- and left-handed threaded internal nipples are cast two heavy projecting lugs, so that an ordinary piece of  $1\frac{1}{8}$ -inch bar-iron flattened at one end, the length of nipple, can be inserted to any desired point in the radiator, and by applying wrench to bar the nipple can be screwed or unscrewed and one or more sections may be added to or taken out independently of all the others in the stack. We furnish these bars in 4-foot lengths. (See page 110.)

# Rococo Wall Radiators—Continued

## Directions for Ordering

For convenience in shipping and handling:

Five-foot Radiators assembled end to end as per figures 11, 12, 13, etc., (see pages 213 and 214) and will be assembled into stacks not larger than four sections.

Seven-foot Radiators assembled end to end, and will be assembled into stacks not larger than three sections.

Nine-foot Radiators assembled end to end, and will be assembled into stacks not larger than two sections.

When assembled side by side, as per figures 15, 16, 17, etc., (see pages 213 and 214) all the three sizes will be assembled into stacks not larger than five sections.

When fitter intends to erect a stack consisting of more sections than above mentioned, or when the sections or stacks are to be set in rows or series (as shown by illustrations on following pages), we provide a right and left-hand threaded nipple *having hexagon nut at center*, enabling the fitter to easily connect the stacks or rows on the job.

We carry these sections in two styles of tappings—horizontal and vertical. In ordering please state which arrangement is desired, and this can be done by giving the figure number of illustrations on pages 211 to 218. Where other arrangement is desired, please send sketch showing exactly what is desired.

## Wall Radiator Brackets

### Footed Vertical Brackets “J”

To fit over a 9½ in. high base-board or skirting, and for supporting Wall Radiators, erected vertically. With each “J” Bracket we furnish one ¼-inch stove bolt and one button which holds the Radiator in position.

Height from floor to center of supply or return end of lowest tapping:

No. J—1 Bracket.....	9½ in.
No. J 2 Bracket.....	7½ in.
No. J—3 Bracket.....	5½ in.

### Footed Horizontal Brackets “K”

To fit over base-board or skirting, and for supporting Wall Radiators, erected horizontally.

With each “K” Bracket we furnish one ¼-inch stove bolt and one button. Height from floor to center of supply or return end of lowest tapping:

No. K—1 Bracket will fit over	11½-inch high base-board or skirting	16 in.
No. K—2 Bracket “ “	9½ “ “ “ “	14 in.
No. K—3 Bracket “ “	7½ “ “ “ “	12 in.
No. K—4 Bracket “ “	5½ “ “ “ “	10 in.
No. K—5 Bracket “ “	3½ “ “ “ “	8 in.
No. K—6 Bracket “ “	1½ “ “ “ “	6 in.

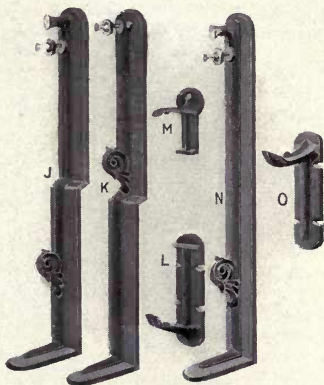
## Rococo Wall Radiators—Continued

### Bracket "L"

Screwed to wall, base board or wainscoting, and supports radiators set either horizontally or vertically. The "L" Bracket is slotted for four wood screws—not furnished by us. Each section requires for its proper support one "L" and one "M" Bracket.

### Bracket "M"

Screwed to wall, base-board or wainscoting, and intended to be used as a guide or to hold in position radiator supported by Bracket "L" or "O." Each section requires for its proper support one "L" or "O" and one "M" Bracket. The "M" Bracket is slotted for two wood screws—not supplied by us.



### Bracket "N"

Is a straight right-angle Bracket, without offset, for supporting Wall Radiators erected vertically or horizontally; height from floor to center of end tapping bosses,  $5\frac{1}{2}$  inches. With each "N" Bracket we furnish one  $\frac{1}{4}$ -inch stove bolt and one button.

### Bracket "O"

Screwed to wall, base-board or wainscoting, and supports underneath section set either horizontally or vertically. Should be used in connection with "M" Bracket for top guide. The "O" Bracket is slotted for four wood screws—not supplied by us.



### Ceiling Bracket "P"

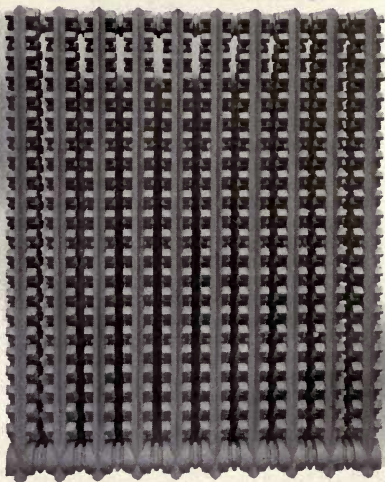
Made of cast plate,  $3\frac{1}{2}$  inches in diameter and screwed to ceiling joists by four screws—not furnished by us. The bolt furnished gives a distance of  $3\frac{1}{2}$  inches to 5 inches from bottom of radiator to ceiling. Other length bolts can be furnished when specially ordered.

**NOTE:**—In ordering buttons and stove bolts separately from brackets, it is necessary to state for which bracket they are wanted, as different lengths of bolts are used for the different brackets.

# Vento Cast-Iron Radiators

For Fan and Blower Work

Patented December 15, 1903



Front view of Ten-Section Group.

Made for Steam or Water, in 40, 50, and 60-inch Sections. A great improvement over pipe coils for Heating and Ventilating work; also for drying work in lumber kilns, laundries, hotels, factories, mills, etc.

## Leading Features

**Few Parts:** Section consists of three parts—main casting and two hexagon nipples. The equivalent Coil consists of a base, eight risers, four nipples and eight elbows, or a total of twenty-one pieces—a difference in favor of the Vento section of 1 to 7.

**Few Joints:** Section is complete with four screwed joints. The equivalent Pipe Coil requires twenty-four screwed joints, or a difference in favor of the Vento section of 1 to 6, or one-sixth as many joints.

**Simplicity:** Sections are easily handled and transported, and may be carried through doors or windows of any building, and can then be assembled into a complete heater. The equivalent Pipe Coil stacks are cumbersome, difficult to handle and transport.



Showing a section cut through center.

# Vento Cast-Iron Radiators

## For Fan and Blower Work

**Small Space:** A complete Vento heater is compact, and occupies about twenty-five per cent less space than the equivalent Pipe Coil heater. This fact invests the Vento Heater with great value, particularly where space is an important factor.

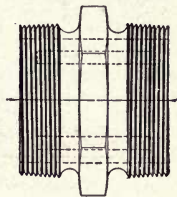
**Elastic Properties:** The ease and simplicity with which the Vento Heater may be either increased or reduced in its capacity, or repaired, are features which will commend it to architects and heating engineers.

### Circulation

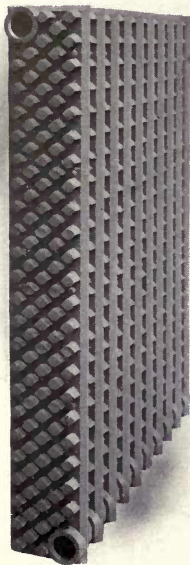
A rapid and uniform circulation of the steam is important and is well provided in the Vento Heater by having the steam enter at the top of each section.

The force of the steam carries it through the connecting ports and drives the air down each of the sections to the air vents at the bottom, thereby securing an even and quick circulation without noise or water-hammer, besides producing equal expansion with no risk of fracture.

In Pipe Coil heaters, the base is usually divided into two compartments. The steam enters on one side of the partition and must then rise through a series of one-inch pipes, sometimes eight or ten feet, before it can deposit the water of condensation in the return or opposite row of pipes, where it belongs. The result is, that when using low-pressure steam in cold weather, the condensation is so rapid in the first row of pipes that a partial vacuum is created, having a tendency to hold the condensation in suspension besides pulling the water out of the return side. The water coming in contact with the intruding steam, causes violent water-hammer and unequal expansion of the base,



Hexagon Nipple



End View of Stack.

with consequent liability to breakage. The construction of the Vento Heater prevents such difficulty.



# Vento Cast-Iron Radiators

For Fan and Blower Work

## 40-Inch Section, 11 1-2 Square Feet

No. of Heater	Number of sections in Group	Square feet heating surface in Group	Equivalent in lineal feet, 1-inch pipe	Area of face in square feet	Air space, net area in sq. feet	Width of Group in inches	Weight of Group in pounds
7	7	80.5	241	9.72	4.34	35	594
8	8	92	276	11.10	4.96	40	670
9	9	103.5	310	12.48	5.58	45	728
10	10	115	345	13.86	6.20	50	851
11	11	126.5	379	15.24	6.82	55	936
12	12	138	414	16.62	7.44	60	1,022
13	13	149.5	448	18.00	8.06	65	1,167
14	14	161	483	19.38	8.68	70	1,193
15	15	172.5	517	20.76	9.30	75	1,278
16	16	184	552	22.14	9.92	80	1,364
17	17	195.5	586	23.52	10.54	85	1,449
18	18	207	621	24.90	11.16	90	1,535

## 50-Inch Section, 14 Square Feet

7	7	98	294	12.15	5.37	35	717
8	8	112	336	13.88	6.14	40	810
9	9	126	378	15.61	6.91	45	923
10	10	140	420	17.34	7.68	50	1,026
11	11	154	462	19.07	8.45	55	1,129
12	12	168	504	20.80	9.22	60	1,232
13	13	182	546	22.53	9.99	65	1,335
14	14	196	588	24.26	10.76	70	1,436
15	15	210	630	25.99	11.53	75	1,539
16	16	224	672	27.72	12.30	80	1,644
17	17	238	714	29.45	13.07	85	1,747
18	18	252	756	31.18	13.84	90	1,852

## 60-Inch Section, 17 Square Feet

7	7	119	357	14.58	6.45	35	864
8	8	136	408	16.66	7.37	40	988
9	9	153	459	18.74	8.29	45	1,112
10	10	170	510	20.82	9.21	50	1,238
11	11	187	561	22.90	10.13	55	1,362
12	12	204	612	24.98	11.05	60	1,486
13	13	221	663	27.06	11.97	65	1,610
14	14	238	714	29.14	12.89	70	1,734
15	15	255	765	31.22	13.81	75	1,858
16	16	272	816	33.30	14.73	80	1,982
17	17	289	867	35.38	15.65	85	2,106
18	18	306	918	37.46	16.57	90	2,230



# Vento Cast-Iron Radiators

## For Fan and Blower Work

### Heating Surface, Measurements and Data

Heating surface 60-Inch Section, 17 square feet; length over all, 60  $\frac{5}{8}$  inches; width, 9  $\frac{1}{4}$  inches. Heating surface 50-Inch Section, 14 square feet; length over all, 51 inches; width, 9  $\frac{1}{4}$  inches. Heating surface 40-Inch Section, 11  $\frac{1}{2}$  square feet; length over all, 41 inches; width, 9  $\frac{1}{4}$  inches.

Distance between centers can be extended by use of 2  $\frac{1}{2}$ -inch wrought iron pipe nipples of necessary length. Tappings 2  $\frac{1}{2}$ -inch right hand on supply end and 2  $\frac{1}{2}$ -inch left hand on return end and bushed to size required. Inside tappings on all bushings furnished with right-hand threads unless otherwise ordered.

### Assembling Sections

The preceding tables of dimensions apply to the single group, starting with seven sections. When more than one group is used, add two and one-half inches to the width for staggering. For the depth, allow one-inch space between the sections. Any size of Radiator may be computed by assembling a number of sections to answer the capacity required; i. e., if a 60-inch Radiator, containing 850 square feet of heating surface, is required, a No. 10 group by five groups deep may be selected, having the following dimensions:

5 sections x 9 inches deep=45 inches, plus 4 inches for air space=49 inches;

50 inches wide, plus 2  $\frac{1}{2}$  inches for staggering=52  $\frac{1}{2}$  inches; making the complete Radiator 49 inches deep, 52  $\frac{1}{2}$  inches wide, 60 inches high; containing 850 square feet of heating surface, the equivalent of 2,550 lineal feet of 1-inch pipe.

Several combinations of the sections may be assembled to form Radiators of varying capacities by double-tiering the sections, using the 40-inch, or 50-inch and 60-inch, or two 40-inch and two 60-inch sections.

Sections are tapped 2  $\frac{1}{2}$  inches, and are connected by means of heavy cast-iron hexagon nipples, right and left-hand threaded.

These Radiators are shipped in stacks of 5 or 6 sections unless otherwise ordered.

### Air Vent Tappings

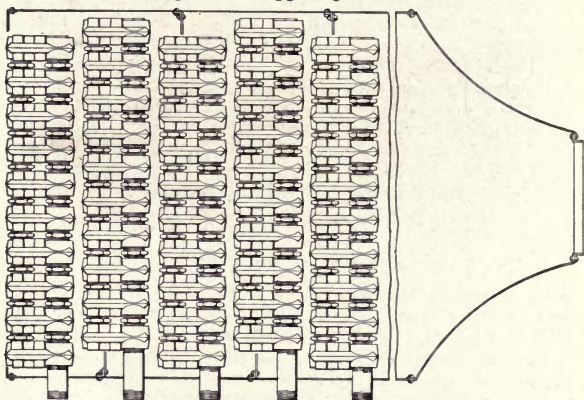
Air Vents should be tapped in *steam supply end* of each group of sections, about 12 inches from the bottom of the section. These separate vents should then be connected together into a header vent pipe.

Send for complete catalogue containing temperature and condensation charts.

## Vento Cast-Iron Radiators

## Assembling and Testing

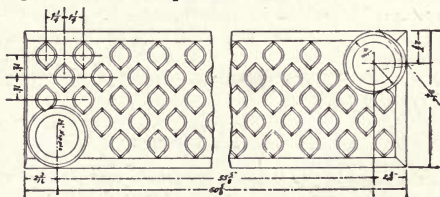
The illustration herewith shows a top view of the Vento Radiator and the plan of staggering the sections.



Patented Dec. 15, 1903

Grooves are provided on the bottom of each section for rods made of one-half inch iron pipe, which form a bearing for rolls of three-quarter inch pipe placed transversely and about twelve inches apart. This method permits free expansion and contraction; and gives an air space under the Radiator thereby adding to its efficiency.

Expansion and contraction, tensile strength, etc., have been given the most severe tests under varying degrees of the initial air temperature above and below zero, with high and low fan velocity, using both live and exhaust steam pressures. Each section is subjected at the Plant to a hydrostatic test of one hundred pounds to the square inch.

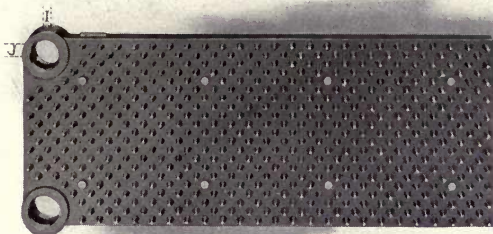


### Side view with detail measurements 60-Inch Section

The severity of these tests fully determines the reliability of this cast-iron construction and permits of a wide margin of safety, as operating pressures in ordinary practice are less than ten pounds to the square inch.

# Sanitary School Pin Indirect Radiators

For Steam and Water



Section for Water



Section for Steam

Each section contains 20 square feet of heating surface. Length  $36\frac{1}{8}$  inches. Height,  $13\frac{3}{8}$  inches. Height at connecting point, on regular pins,  $15\frac{1}{4}$  inches. When special tappings (2 inches or smaller) are at "I," height at connecting point is  $15\frac{1}{2}$  inches. When tapping is at "J," length is  $36\frac{3}{8}$  inches.

Width each section occupies in stack, 4 inches. If other distances between centers are desired we can furnish nipples giving a distance of  $3\frac{3}{4}$ ,  $4\frac{1}{4}$  or  $4\frac{1}{2}$  inches from center to center of assembled sections.

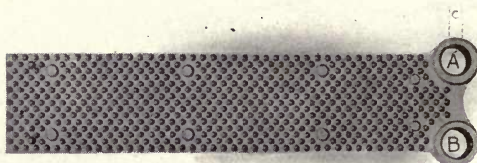
These Indirects are tapped 2 inches, right-hand on supply end and left-hand on the return, and can be bushed to such smaller size as is desired. When tappings are bushed smaller, the inside tappings in bushings will be right-hand, unless otherwise ordered.

Connected with extra heavy 2-inch right- and left-hand threaded nipples, having hexagon nut at center. Steam sections are *always* shipped separately. Water sections are shipped separately unless otherwise ordered; when ordered assembled they are shipped in stacks of 5 or 6 sections.

# Perfection Pin Indirect Radiators

For Steam or Water

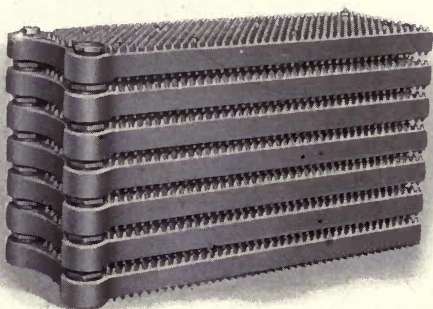
With Right- and Left-Hand Threaded Nipples



"Standard" size, single section, with extra heavy right and left-hand threaded nipple connections with hexagon nut in center.

Each section of Perfection Pin Indirect "Standard" size, with right and left-hand threaded nipple connections, contains 10 square feet of heating surface. Length,  $36\frac{1}{4}$  in. Height,  $7\frac{1}{2}$  in. Height at connecting point  $9\frac{1}{8}$  in. Width each section occupies in stack,  $2\frac{3}{4}$  in. If greater distance between centers is desired, we can furnish extra long nipples giving a distance of  $3, 3\frac{1}{4}, 3\frac{1}{2}$  or  $3\frac{3}{4}$  in. between centers of standard size.

Each section of Perfection Pin Indirect "Extra Large" size, with right and left-hand threaded nipple connections, contains 15 square feet of heating surface. Length,  $36\frac{1}{4}$  in. Height,  $11\frac{1}{2}$  in. Height at connecting point, 14 in. Width each section occupies in stack,  $2\frac{7}{8}$  in.; or, when specially ordered, can be increased to  $3\frac{1}{8}, 3\frac{3}{8}, 3\frac{5}{8}$  or  $3\frac{7}{8}$  in. between centers.



Complete Stack (sections are shipped separately unless otherwise ordered; when ordered assembled are shipped in stacks of 5 or 6 sections.) "Standard" and "Extra Large" sizes are tapped 2-inch, and can be bushed to such smaller size as is desired.

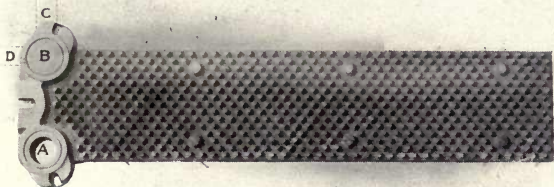
Openings will have 2-inch right-hand tapping on one side and 2-inch left-hand tappings on the other. Connected with extra heavy 2-inch right and left-hand threaded hexagon nipples. When tappings are bushed to smaller sizes, the inside tappings in bushings will be right-hand unless otherwise ordered.

If location of tapping is desired other than regular, we can furnish these radiators, when specially ordered, in the "Extra Large" size with special tappings at "A," "B," "C" and "D," 2 inches or smaller; the "Standard" size can be tapped 2 inches or smaller at "A" and "B," and  $1\frac{1}{4}$  inch or smaller at "C" and "D." These indirects can also be furnished with same special tappings at reverse end of stack, if desired.

# Perfection Pin Indirect Radiators

For Steam or Water

With Flange and Bolt Connections



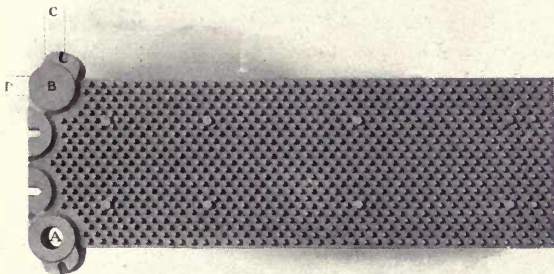
"Standard" Size, Single Section, with Bolt and Flange Connections.

Both "Standard" and "Extra Large" sizes are tapped 2 inches, and can be bushed to such smaller size as is desired.

All openings will have right-hand threads unless otherwise ordered.

If location of tappings is desired other than regular, as shown by "A" in cut, we can furnish special tappings at "B," 2 inches or smaller; "C," 1 1/4 inches or smaller; "D," 1 1/4 inches or smaller. Can also furnish same special tappings at reverse end of stack if desired.

Each section of Perfection Pin Indirect "Standard" size contains 10 square feet of heating surface. Length, 36 1/4 inches. Height, 7 1/2 inches. Height at connecting point, 11 1/2 inches. Width each section occupies in stack, 2 3/4 inches; or when specially ordered, this can be increased 1/4 inch, to give additional air area between sections, by furnishing sections with extra-heavy bosses.



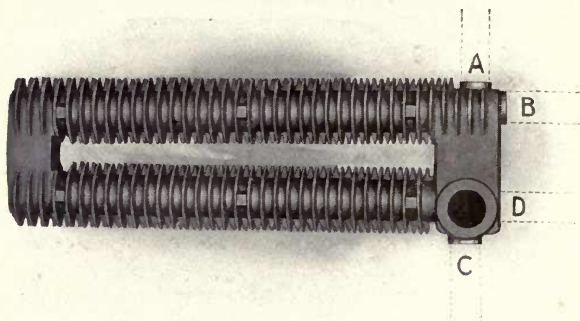
"Extra Large" Size Section with Bolt and Flange Connection.

Each section of Perfection Pin Indirect "Extra Large" size, contains 15 square feet of heating surface. Length, 36 1/4 inches. Height, 11 1/2 inches. Height at connecting point, 15 1/2 inches. Width each section occupies in stack, 2 3/8 inches; or, when specially ordered, this can be increased 1/4 or 1/2 inch, to give additional air area between sections, by furnishing sections with extra-heavy bosses.

The assembling of these radiators is a very simple matter and consequently they are always shipped in separate sections which can be assembled one at a time in the cradle which is used to support them in place.



# Excelsior Junior Indirect Steam Radiators



Single Section — showing Special Tappings

Each section of Excelsior Junior Indirect Steam Radiator contains 8 square feet of heating surface.

Length of section,  $23\frac{3}{4}$  inches. Height, 8 inches.

Width each section occupies in stack,  $3\frac{3}{8}$  inches; or, when specially ordered connected with extra long nipples, to give additional air area between sections:  $3\frac{5}{8}$ ,  $3\frac{7}{8}$ ,  $4\frac{1}{8}$ , or  $4\frac{3}{8}$  inches.

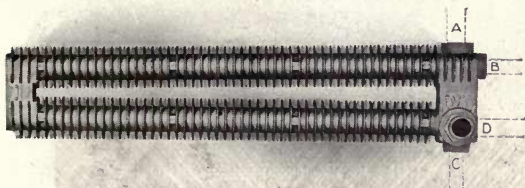
The nipples for connecting sections are extra heavy  $1\frac{1}{2}$ -inch, right- and left-hand threaded, with hexagon nut at the center. Sections are shipped separately unless otherwise specified; when ordered assembled, are shipped in stacks of 5 or 6 sections.

Regular tapping is  $1\frac{1}{2}$ -inch; supply tapping has right-hand thread; return tapping, left-hand thread. If smaller than  $1\frac{1}{2}$  inch tapping be required for Excelsior Junior Steam Indirect, a  $1\frac{1}{2}$ -inch nipple and a reducing elbow should be used, instead of a bushing, to avoid interference with diaphragm opening. As these tapped openings should never be bushed, we do not, under any circumstances, ship them with bushings.

If location of tapping is desired other than regular, we can furnish special tapings as shown in above cut: "A,"  $1\frac{1}{2}$ -inch tapping or smaller; "B,"  $1\frac{1}{4}$ -inch tapping or smaller; "C,"  $1\frac{1}{4}$ -inch tapping or smaller; "D,"  $1\frac{1}{4}$ -inch tapping or smaller.

# Excelsior Indirect Radiators

For Steam and Water



**Excelsior Indirect Steam Section—showing Special Tappings**

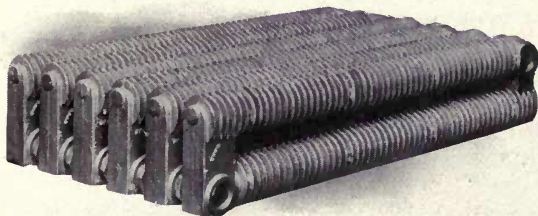
Length of Excelsior Indirect Steam Section, 36 inches. Excelsior Indirect Hot-Water Section,  $36\frac{3}{4}$  inches. Height, 8 inches.

Width occupied in stack,  $3\frac{3}{8}$  inches; or, when specially ordered connected with extra long nipples, to give additional air area between sections,  $3\frac{5}{8}$ ,  $3\frac{7}{8}$ ,  $4\frac{1}{8}$ , and  $4\frac{3}{8}$  inches. Each section contains 12 square feet of heating surface in both Steam and Hot Water. Sections are shipped separately unless otherwise ordered; when ordered assembled are shipped in stacks of 5 or 6 sections.

Connected with extra-heavy  $1\frac{1}{2}$ -inch right and left-hand threaded nipples, having hexagon nut at the center.

Regular tapping is  $1\frac{1}{2}$ -inch; supply tapping has right-hand thread, return tapping, left-hand thread. If smaller than  $1\frac{1}{2}$ -inch tapping be required for Excelsior Steam Indirect, a  $1\frac{1}{2}$ -inch nipple and a reducing elbow should be used, instead of a bushing, to avoid interference with diaphragm opening.

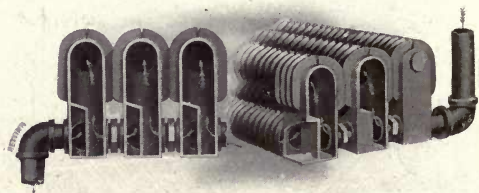
As openings should never be bushed, we do not under any circumstances ship stacks with less than  $1\frac{1}{2}$ -inch opening.



**Excelsior Indirect Water Radiator—Complete Stack**

If location of tapping is desired other than regular, we can furnish special tappings as shown above: "A,"  $1\frac{1}{2}$ -inch tapping or smaller; "B,"  $1\frac{1}{4}$ -inch tapping or smaller; "C,"  $1\frac{1}{4}$ -inch tapping or smaller; "D,"  $1\frac{1}{4}$ -inch tapping or smaller.

## Excelsior Indirect Radiators—Continued



### Steam Indirect Connections

The above cut shows:

*First.*—The supply pipe attached, as it should always be, to the right hand side of stack, and return pipe to the left-hand side.

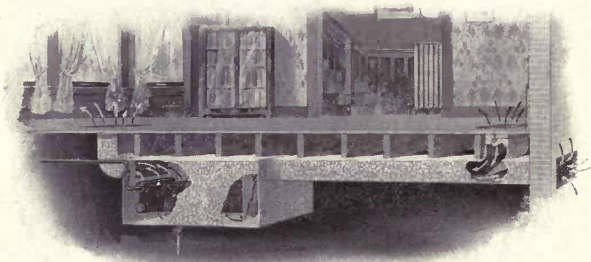
*Second.*—The distance the sections should be set from each other, which should be so the flanges will interlock about  $\frac{1}{8}$ -inch. When specially ordered, however, sections will be connected with extra long nipples, to give additional air area between the sections.

*Third.*—The diaphragm or partition; its location and shape; which is such as to make the circulation of steam absolutely positive, and also allow the water of condensation to pass freely under it and directly to the return pipe. Because of this diaphragm bushings should not be used.

*Fourth.*—The air vent should be placed on the return connection or close to same.

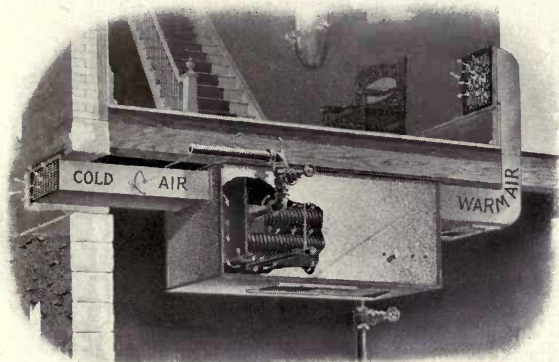
### Directions for Setting Steam Indirect

Hangers made of  $\frac{1}{2}$ -inch or  $\frac{5}{8}$ -inch round iron having coach screw threads at one end and an eye or ring turned at the other end large enough to receive 1-inch or  $1\frac{1}{4}$ -inch iron pipe, may be easily screwed to the joists or timbers overhead. Those hangers are usually placed one at each side of the four corners about 6 inches from the end and opposite each other, so that the horizontal pipe support may pass through the rings or eyes. The hanger supporting the return end of the stack should be slightly lower ( $\frac{1}{4}$  to  $\frac{1}{2}$ -inch) than the others so that the water of condensation may have a positive flow toward the return connection. The distance from the top of the stack to the ceiling should be from 10 to 12 inches and the air space below the stack to the bottom of the casing, from 6 to 8 inches. The ceiling over the stack is usually covered with galvanized iron or tin.



The illustration shows a good method for incasing indirect radiation and also suggests a simple way to secure rotary circulation of the air in the room when it becomes desirable to shut off the out-door supply.

## Excelsior Indirect Radiators—Continued



### Hot Water Connections

The flow connection to the indirect stack is made to the upper side or end supply tapping, and the return connection is taken from the lower tapping on the opposite side.

When the flow pipe, as shown in the illustration, is at the highest point of its connection to the stack, the air vent must be taken from there, either by attaching an air valve or connecting a  $\frac{1}{4}$ -inch or  $\frac{3}{8}$ -inch iron pipe and carrying same to the expansion pipe or nearest riser. If the flow connection, however, pitches downward from an overhead main to the stack, no special air vent will be required.

The illustration shows a good method for encasing the indirect stack and introducing the fresh air through a galvanized iron duct and delivering the warm air through a side wall register.

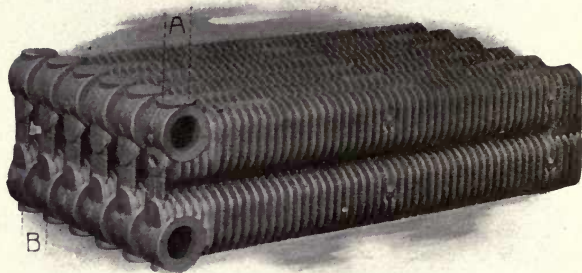
Directions for setting are similar to those given for steam on the preceding page.

### Data for Excelsior Indirect Steam Radiators

Heat- ing Sur- face	Cold Air Sup- ply	Diam- eter of Duct if Round	Hot Air Flue	Size for Brick Work if Hot Air Flues	Size of Register	Ratio of 1 to 30	Ratio of 1 to 35	Ratio of 1 to 40
Sq. ft.	Sq. in.	Inches	Sq. in.	Inches	Inches	Cu. ft.	Cu. ft.	Cu. ft.
24	36	6.8	48	4x12	8x 8	720	840	960
36	54	8.3	72	8x12	9x12	1080	1260	1440
48	72	9.6	96	8x12	10x14	1440	1680	1920
60	90	10.0	120	12x12	12x15	1800	2100	2400
72	108	11.7	144	12x12	12x19	2160	2520	2880
84	126	12.7	168	12x16	14x22	2520	2940	3360
96	144	13.5	192	12x16	14x24	2880	3360	3840
108	162	14.4	226	12x20	16x20	3240	3780	4320
120	180	15.2	240	12x20	16x24	3600	4200	4800
132	198	15.9	264	12x24	20x20	3960	4620	5280
144	216	16.6	288	12x24	20x24	4320	5040	5760

# Cardinal Indirect Radiators

For Steam or Water



Complete Stack

Each section of Cardinal Indirect contains 15 square feet of heating surface.

Length of section,  $37\frac{1}{4}$  inches; height, at connecting end,  $11\frac{1}{4}$  inches; at opposite end,  $9\frac{1}{4}$  inches.

Width each section occupies in stack,  $3\frac{1}{2}$  inches; or, when specially ordered connected with extra long nipples, to give additional air area between sections, can be increased to  $3\frac{3}{4}$ , 4,  $4\frac{1}{4}$  or  $4\frac{1}{2}$  inches.

The nipples used for connecting sections are extra-heavy 2-inch, right and left-hand threaded, with hexagon nut at the center. Sections are shipped separately unless otherwise specified; when ordered assembled, are shipped in stacks of 5 or 6 sections.

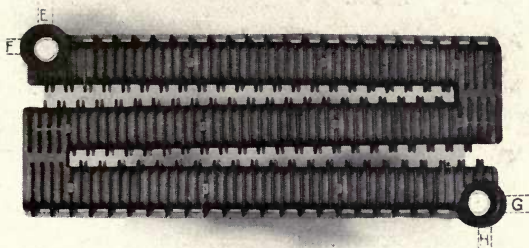
Regular tapping is 2 inches, and can be bushed to any smaller size desired. Supply tapping has right-hand thread; return tapping, left-hand thread—unless otherwise ordered. But when radiator is wanted tapped smaller than 2 inches, the tapping within the bushing is right-hand, unless otherwise ordered.

If location of tapping is desired other than regular, we can furnish special tapplings as shown in above illustration, "A,"  $1\frac{1}{2}$ -inch tapping or smaller; "B,"  $1\frac{1}{2}$ -inch tapping or smaller.



# Sterling Indirect Radiators

For Steam or Water



Single Section

Each section of Sterling Indirect contains 20 square feet of heating surface. Length of section,  $36\frac{3}{4}$  inches; height  $15\frac{3}{4}$  inches.

Width each section occupies in stack,  $3\frac{1}{2}$  inches; or when specially ordered this can be increased to  $3\frac{3}{4}$ ,  $3\frac{7}{8}$ , 4,  $4\frac{1}{4}$  or  $4\frac{1}{2}$  inches, by using extra long nipples, to give additional air area between sections. Sections are shipped separately unless otherwise ordered; when ordered assembled are shipped in stacks of 5 or 6 sections.

The nipples used for connecting sections are extra heavy 2-inch, right and left-hand threaded, with hexagon nut at the center.

Unless otherwise ordered, Sterling Indirects are tapped 2 inches, right-hand on supply end and 2-inch left-hand on return end, and can be bushed to any smaller size desired.

If location of tapping is desired other than regular, we can furnish special tapplings as shown in above illustration at "E," "F," "G," or "H"  $1\frac{1}{2}$  inches or smaller.

## Data on Indirect Radiators

All AMERICAN Indirect Radiators are shipped with sufficient nipples to put the stack together on the job.

If the sections are assembled at our Plants an extra charge is made for the work.

All indirect air-valve tappings are regularly made  $\frac{3}{8}$  inch.

### Measurements

Length of Section	Ex-treme Height	Pattern Name	Heating Surface	Width Each Section Occupies in Stack Inches †	Regular Tapping
23 $\frac{3}{4}$	8	Excelsior Jr. Steam .	8	3 $\frac{3}{8}$	‡1 $\frac{1}{2}$
36	8	Excelsior Steam . . . . .	12	3 $\frac{3}{8}$	‡1 $\frac{1}{2}$
36 $\frac{3}{4}$	8	Excelsior Water . . . . .	12	3 $\frac{3}{8}$	‡1 $\frac{1}{2}$
36 $\frac{1}{4}$	11 $\frac{1}{2}$	Perfection Flange and Bolt, standard size, Steam or Water . . . .	10	2 $\frac{1}{4}$	*2
36 $\frac{1}{4}$	15 $\frac{1}{2}$	Perfection Flange and Bolt, extra-large size Steam or Water . . .	15	2 $\frac{7}{8}$	*2
36 $\frac{1}{4}$	9 $\frac{13}{16}$	Perfection R. & L. Threaded, standard size, Steam or Water	10	2 $\frac{3}{4}$	*2
36 $\frac{1}{4}$	14	Perfection R. & L. Threaded, extra-large size, Steam or Water	15	2 $\frac{7}{8}$	*2
37 $\frac{1}{4}$	11 $\frac{1}{4}$	Cardinal, Steam or Water . . . . .	15	3 $\frac{1}{2}$	2
36 $\frac{3}{4}$	15 $\frac{3}{4}$	Sterling, Steam or Water . . . . .	20	3 $\frac{1}{2}$	*2
36 $\frac{1}{8}$	15 $\frac{1}{4}$	Sanitary School Pin, Steam or Water . . .	20	4	*2

\*These Radiators are all regularly tapped 2 inch, and bushed according to the size specified in order.

† When greater air space is desired between the sections, we can so furnish on special order.

‡ Bushing reduction cannot be made. (See page 128.)

# Asbestos Molded Covering

Stock No. 400

For Low and High Pressure Steam Pipes

Composed of Asbestos and other fire-proof non-conducting materials, all of a superior quality. The Asbestos used is of unusually long fiber, which also serves as a thorough binder, and with the outer shell or wrapper of canvas, makes a very durable, as well as an excellent non-conductor. Is made



in sections three feet long. Sections are cut lengthwise through the center, and price includes brass-lacquered bands to hold in position on the piping.

Prices on Air-Cell and other types of Pipe Covering furnished upon application.

## Wool-Felt Covering

Stock No. 401

For Hot Water Pipes

Can furnish in  $\frac{1}{2}$ -inch,  $\frac{3}{4}$ -inch and one-inch thicknesses;  $\frac{1}{2}$  inch will be shipped unless otherwise specified.

Composed of successive layers of soft wool-felt lined with asbestos sheathing and furnished with canvas jacket and brass-lacquered bands. Supplied in sections three feet long cut lengthwise through the center.



### Asbestos and Wool-Felt Price List

Inside Diameter of Pipe	Price Per Lineal Foot	Elbows	Tees	Globe Valves
$\frac{1}{2}$ in.	\$ .22	\$ .30	\$ .36	\$ .54
$\frac{3}{4}$ "	.24	.30	.36	.54
1 "	.27	.30	.36	.54
$1\frac{1}{4}$ "	.30	.30	.36	.54
$1\frac{1}{2}$ "	.33	.30	.36	.54
2 "	.36	.36	.42	.60
$2\frac{1}{2}$ "	.40	.42	.48	.78
3 "	.45	.48	.54	.96
$3\frac{1}{2}$ "	.50	.54	.60	1.20
4 "	.60	.60	.75	1.50
$4\frac{1}{2}$ "	.65	.72	.90	1.85
5 "	.70	.90	1.20	2.25
6 "	.80	1.30	1.60	2.80
7 "	1.00	1.80	2.20	3.60
8 "	1.10	2.40	3.00	4.40
9 "	1.20	3.00	3.80	5.30
10 "	1.30	3.60	4.60	6.20
12 "	1.85			
Out. Diam.		Use Cement or Blocks for fittings larger than 10 inches and for all flanged and irregular fittings.		
14 in.	2.10			
16 "	2.35			
18 "	2.60			
20 "	2.85			
24 "	3.30			
30 "	4.00			

# Asbestocel

Stock No. 399.

For Covering Pipe and Fittings



## Full Section Showing Corrugations

A pipe-covering made up in layers of plain and corrugated (or ribbed) asbestos paper. Better than the usual air-cell type, being built on the arch principle—that is, the corrugations or ribs run around the pipe instead of lengthwise, and keep out all circulation of outer air, thus keeping the heat in the pipe and saving coal. Gives the maximum amount of protection against loss of heat. Outlasts all ordinary coverings.

Has all the heat-resisting qualities of asbestos. Is not costly, yet far better than the clay and other plastic mixtures.

Furnished in sections of standard thickness 3 feet long, neatly finished with canvas and bands.

## List Prices

Inside Diameter of Pipe Inches	Price per Lineal Foot	Elbows	Tees	Crosses	Globe Valves	Flange Covers
½	\$ .22	\$ .30	\$ .36	\$ .48	\$ .54	\$ .50
¾	.24	.30	.36	.48	.54	.50
1	.27	.30	.36	.48	.54	.50
1¼	.30	.30	.36	.48	.54	.50
1½	.33	.30	.36	.48	.54	.50
2	.36	.36	.42	.54	.60	.60
2½	.40	.42	.48	.60	.78	.70
3	.45	.48	.54	.70	.96	.80
3½	.50	.54	.60	.80	1.20	.90
4	.60	.60	.75	.95	1.50	1.00
4½	.65	.72	.90	1.10	1.85	1.30
5	.70	.90	1.20	1.50	2.25	1.60
6	.80	1.30	1.60	2.00	2.80	1.90
7	1.00	1.80	2.20	2.80	3.60	2.20
8	1.10	2.40	3.00	3.60	4.40	2.50
9	1.20	3.00	3.80	4.40	5.30	2.90
10	1.30	3.60	4.60	5.20	6.20	3.30
12	1.85					
14	2.10					
16	2.35					
18	2.60					
20	2.85					
24	3.30					
30	4.00					

For irregular flanges or fittings larger than 10 inches, use our Asbestos Cement or Asbestos Cement Felting

# Ideal Plastic Asbestos

Stock No. 402

The IDEAL Asbestos should be applied to a warm surface in thin coats: the first coat left a rough surface and allowed to dry. Mix with water and apply with a trowel, finishing with a wet brush. When dry give a coat of paint; or when applying last coat, mix Asbestos half and half with Portland Cement; final coat should be about  $\frac{1}{8}$ -inch thick, with a very hard finish.

## List Prices

Per bag of 100 pounds .....\$4.00  
Per bag of 50 pounds ..... 2.15

Amount of Cement required to cover IDEAL Boilers  $1\frac{1}{4}$  inch thick:

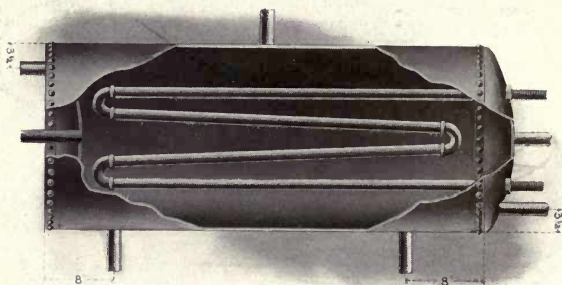
Arco Boilers		No. of Boiler	Pounds	No. of Boiler	Pounds
No. of Boiler	Pounds	22-3-W	150	36-5	575
1-19-S or W	125	22-4-W	175	36-6	650
2-19-S or W	150	22-5-W	200	36-7	725
3-19-S or W	175	25-3-W	175	36-8	800
1-22-S or W	150	25-4-W	200	36-9	875
2-22-S or W	175	25-5-W	225	48-6	850
3-22-S or W	200	28-3-W	200	48-7	950
1-25-S or W	175	28-4-W	250	48-8	1050
2-25-S or W	200	28-5-W	300	48-9	1150
3-25-S or W	225	31-3-W	250	Premier Steam and Water	
1-28-S or W	200	31-4-W	300		
2-28-S or W	250	31-5-W	350	1015 or 1115	125
3-28-S or W	275	34-3-W	325	2015 or 2115	150
1-31-S or W	250	34-4-W	375	3015 or 3115	175
2-31-S or W	300	34-5-W	425	1018 or 1118	150
3-31-S or W	325	Sectional Steam and Water		2018 or 2118	175
1-34-S or W	300			3018 or 3118	200
2-34-S or W	350	15-4	100	1021 or 1121	175
3-34-S or W	375	15-5	125	2021 or 2121	200
Standard Boilers		15-6	150	3021 or 3121	225
		22-5	275	4021 or 4121	250
15-1-W	75	22-6	325	1024 or 1124	200
15-2-W	75	22-7	375	2024 or 2124	225
17-3-W	100	22-8	425	3024 or 3124	250
17-4-W	125	28-5	500	4024 or 4124	275
17-5-W	150	28-6	575	1027 or 1127	225
19-3-W	125	28-7	650	2027 or 2127	250
19-4-W	150	28-8	725	3027 or 3127	275
19-5-W	175			4027 or 4127	300

On Boilers not listed here estimate 6 pounds to the square foot— $1\frac{1}{4}$  inches thick.



# Steel Storage Tanks

With or Without Coil



Showing location of Tank tapings, vertical or horizontal.  
Coil openings vary according to size and shape of coil.

## Important Information

All tanks listed on pages 138 and 139 can be furnished galvanized.

Orders for tanks with coils or in any way special, not subject to cancellation.

Tank legs, per set of three—List Price \$3.00. See page 32.

Regular tests run from 80 lbs. to 100 lbs. cold hydrostatic pressure. Higher tests or pressures can be given as work requires.

Extra charge will be made for special tapings.

In ordering, state whether vertical or horizontal tanks are wanted. Unless otherwise ordered, tanks without coils, manholes or handholes will be shipped, and tapings located as per cut above. All openings tapped for 2-inch pipe and reinforced.

## Special Note

The quality of the material used and the method of construction make these tanks first-class in every particular. Attention is called to the gauge of thickness of shells and heads employed in the manufacture both of the Storage and Extra-Heavy Storage Tanks. When these tanks are to be subjected to sudden or unusual pressure, as in the case where tanks are connected direct to City Pumping Station and the pressure is increased during times of conflagrations or the like, we can build tanks of greater gauge or thickness of metal, or it is recommended the system be equipped with Water Pressure Reducing Valve.

Prices of special tanks furnished on application.

# Coils for Storage Tanks

We can, upon special order, equip Tanks with return bend coils, at extra charge, as per list below. Size of coil must be determined by heating contractor, who alone is familiar with all the conditions surrounding installation.

## List Prices for Coils

Prices are per lineal foot, and include necessary return bends and lock nuts, and provide for placing coil in tank.

Spiral coils can be furnished. Prices on application.

Coil made of.....	1 in.	1 ¼ in.	1 ½ in.	2 in.
Black iron pipe with black return bends and lock nuts.....	\$ .50	\$ .60	\$ .65	\$ .85
Galvanized iron pipe with galvanized return bends and lock nuts.....	.60	.70	.80	1.10
Brass (iron pipe size) pipe with brass return bends and lock nuts.....	1.50	2.15	2.40	3.00
Tinned brass (iron pipe size) pipe with tinned brass return bends and lock nuts.....	1.90	2.70	3.10	4.45
Copper (iron pipe size) pipe with tinned brass return bends and lock nuts.....	1.95	2.80	3.15	4.60

Approximate weights per foot: 1 in., 4 lbs.; 1 ¼ in., 4 ½ lbs.; 1 ½ in., 5 lbs.; 2 in., 7 lbs.

A standard coil is one prepared with Return Bends and made of four pipes, the lineal feet being as follows for the various lengths of Tanks:

Tank —	48 inches long,	14 lineal feet
“ —	60 “	18 “
“ —	72 “	22 “
“ —	84 “	26 “
“ —	96 “	30 “
“ —	108 “	34 “
“ —	120 “	38 “

We recommend 1 inch Pipe on Tanks of 20 and 22 inches diameter  
 “ “ 1 ¼ “ “ “ “ “ 24 “ 30 “ “  
 “ “ 1 ½ “ “ “ “ “ “ 36 “ “  
 “ “ 2 “ “ “ “ “ 42 and 48 “ “

It is advisable to have a manhole in head of all tanks containing coils. This should be remembered when figuring. Quotations will upon application be promptly furnished on styles and sizes of coils other than above.

# Black Steel Storage Tanks

Thickness of shell  $\frac{3}{16}$  in. Heads  $\frac{1}{4}$  in. All seams single riveted

No.	Size Inches	Capacity Gallons	Weight Pounds	List Price
409	18 x 72	79	330	\$54 00
410	18 x 36	40	200	41 00
411	18 x 48	53	250	45 00
412	18 x 60	66	290	49 00
413	18 x 84	92	370	58 00
414	18 x 96	106	410	62 00
415	20 x 48	65	275	47 00
416	20 x 60	82	320	51 00
417	20 x 72	98	360	55 00
418	24 x 36	71	280	46 00
419	24 x 42	82	300	49 00
420	24 x 48	94	335	52 00
421	24 x 60	117	390	57 00
422	24 x 72	141	440	62 00
423	24 x 84	164	500	68 00
424	24 x 96	188	550	74 00
425	24 x 108	212	600	80 00
426	24 x 120	235	660	86 00
427	30 x 36	110	365	56 00
428	30 x 48	147	430	61 00
429	30 x 60	184	495	67 50
430	30 x 72	221	560	73 00
431	30 x 84	258	640	81 00
432	30 x 96	294	700	88 50
433	30 x 108	335	770	96 00
434	30 x 120	372	840	103 50
435	36 x 36	159	460	69 00
436	36 x 48	212	540	75 50
437	36 x 60	265	615	83 00
438	36 x 72	318	690	90 50
439	36 x 84	371	780	100 50
440	36 x 96	424	860	109 00
441	36 x 108	477	940	117 50
442	36 x 120	530	1020	126 00
443	42 x 60	360	740	103 00
444	42 x 72	432	835	112 50
445	42 x 84	504	925	122 00
446	42 x 96	572	1020	132 00
447	42 x 108	644	1120	142 00
448	42 x 120	716	1225	153 00
449	42 x 144	860	1425	175 00

The above list prices include regular tappings, and 1 handhole if desired.

Extra handholes ( $3\frac{1}{2}$ " x  $4\frac{1}{2}$ ") \$5.00 each.

Manhole in Shell ( $11\frac{1}{2}$ " x  $14\frac{1}{2}$ ") \$12.50 each.

Manhole in Head ( $11\frac{1}{2}$ " x  $14\frac{1}{2}$ ") \$15.00 each.

See important information on pages 136 and 137.

# Black Steel Extra-Heavy Storage Tanks

Thickness of shell  $\frac{1}{4}$  in. Heads  $\frac{5}{16}$  in. All seams single riveted

No.	Size Inches	Capacity Gallons	Weight Pounds	List Price
450	18 x 36	40	260	\$ 45 00
451	18 x 48	53	315	50 00
452	18 x 60	66	370	55 00
453	18 x 72	79	420	61 00
454	18 x 84	92	470	66 50
455	18 x 96	106	525	72 00
456	20 x 48	65	350	53 00
457	20 x 60	82	400	58 00
458	20 x 72	98	460	63 00
459	24 x 36	71	350	52 00
460	24 x 42	82	390	54 00
461	24 x 48	94	425	58 50
462	24 x 60	117	495	65 00
463	24 x 72	141	565	71 00
464	24 x 84	164	650	80 00
465	24 x 96	188	720	86 00
466	24 x 108	212	790	92 00
467	24 x 120	235	860	98 00
468	30 x 36	110	460	63 00
469	30 x 48	147	550	70 00
470	30 x 60	184	635	77 00
471	30 x 72	221	720	84 00
472	30 x 84	258	825	95 00
473	30 x 96	294	915	103 00
474	30 x 108	335	1000	111 00
475	30 x 120	372	1090	119 00
476	36 x 36	159	580	77 00
477	36 x 48	212	685	86 00
478	36 x 60	265	790	95 00
479	36 x 72	318	890	104 00
480	36 x 84	371	1010	116 00
481	36 x 96	424	1110	126 00
482	36 x 108	477	1215	136 00
483	36 x 120	530	1325	146 00
484	36 x 144	636	1530	166 00
485	42 x 60	360	950	118 00
486	42 x 72	432	1070	128 50
487	42 x 84	504	1195	139 00
488	42 x 96	572	1315	150 00
489	42 x 108	644	1455	161 00
490	42 x 120	716	1575	172 00

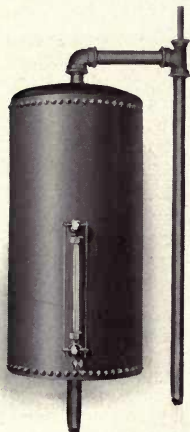
The above list prices include regular tapplings, and one handhole if desired.

Extra handholes ( $3\frac{1}{4}$ " x  $4\frac{1}{2}$ ") \$5.00 each. Manhole in Shell ( $11\frac{1}{2}$ " x  $14\frac{1}{2}$ ") \$12.50 each. Manhole in Head ( $11\frac{1}{2}$ " x  $14\frac{1}{2}$ ") \$15.00 each.

See important information on pages 136 and 137.

# Galvanized Expansion Tanks

Stock No. 491



These Tanks are made of refined Galvanized Steel tested at one hundred pounds pressure, and are good for full rated capacity.

Tanks are riveted and calked.

**TAPPING**—These Tanks are tapped top and bottom for one inch overflow and expansion pipe, and on side for feed pipe.

Water-gauge tappings 12 inches between centers.

## List Prices for Tanks and Water Gauges

Style	Size Inches	Capacity Gallons	Square Feet of Radiation	Price of Tank	Price of Gauge
0	10 x 20	8	250	\$ 7 50	\$1 75
1	12 x 20	10	300	8 00	1 75
2	12 x 30	15	500	9 00	1 75
3	14 x 30	20	700	12 50	1 75
4	16 x 30	26	950	14 00	1 75
5	16 x 36	32	1300	15 00	1 75
6	16 x 48	42	2000	16 50	1 75
7	18 x 60	66	3000	31 00	1 75
8	20 x 60	82	5000	37 00	1 75
9	22 x 60	100	6000	51 00	1 75

## Ideal Expansion Tank Bracket

Stock No. 497



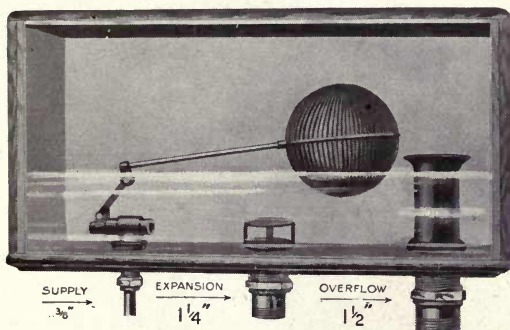
Takes in all sizes of tanks, from 10 to 16 inches in diameter. Labor-saving—can be erected in two minutes. A substitute for the old-fashioned shelf, at less expense. Weighs about 5½ pounds and is shipped with screws packed under the slide pieces.

List price each, complete,  
\$1.75.



# Ideal Automatic Expansion Tanks

Stock Nos. 492 and 493



The Expansion Tank above illustrated, aside from being ornamental, is absolutely automatic in its operation, *insuring always that the system will be full of water.* It is a great convenience to the house-owner. There is danger of freezing if the ordinary non-automatic tank is placed in the attic or some out-of-the-way closet. Besides, the customer is often opposed to having an ungainly steel or iron Expansion Tank placed in the bath room or in a living room. The Ideal Tank is made of hardwood, lined with sheet copper, and is finished and varnished to match the woodwork of the room. It does not require altitude gauge nor gauge glass and fittings.

Inside measurements of Tank are: 20 inches long, 9 inches wide, 10 inches deep; and of ample capacity for use on any job of hot-water work to which there is attached 3000 feet of radiation or less.

## Roughing-in Measurements.

2 $\frac{7}{8}$  inches from outside rear edge of tank to center of either overflow or expansion.

5 $\frac{5}{8}$  inches from center of overflow to right side edge of tank.

5 $\frac{5}{8}$  " " " " center of expansion.

3 $\frac{3}{8}$  " " " supply to back edge of tank.

4 $\frac{5}{8}$  " " " " left side " "

## Price List for Tanks.

*Including expansion and overflow couplings, with iron pipe thread.*

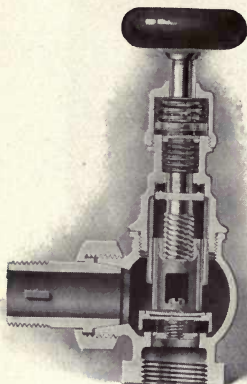
Style	Stock No.		Price, each
252	492	Square corners, varnished, plain oak.....	\$8.50
262	493	Rounded corners, varnished, plain oak.....	9.00

Upon special order, we can furnish these Tanks in genuine cherry, walnut or quarter-sawed oak, at \$1.25 each extra, net.

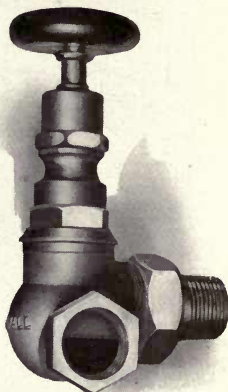
*Please order by Number and Style.*

# Norwall Packless Radiator Valve

## For Low Pressure and Vacuum Steam Heating



Angle Valve



Corner Valve

The Norwall Packless Quick-Opening Radiator Valve is a valve of the highest possible grade embodying the additional features of being *self-packed* and *quick-opening*. It will not leak steam, water or air around the stem of the valve at any time or under any conditions of service.

The stem is sectional and non-rising. Tight joints are insured by the use of two special indestructible anti-friction composition disks which are held firmly in place by spring pressure. The upper section of the stem bears directly on the hub of the valve, and no amount of downward or lateral pressure on the handle can unseat the disks, causing the valve to leak. The middle section is non-rising, threaded on its lower half and fitted to spirally engage the lower section, the raising or lowering of which opens or closes the valve *with less than two full turns of the handle*. Between the lower part of the stem and the main disk holder is placed a special bronze spring disk which compensates the shrinkage of the valve stem as it cools by imparting an *elastic* instead of a *fixed* pressure on the seat when the valve is closed. By the use of this device the "quick-opening" feature of the Norwall is made possible.

The Norwall Packless Valve used in conjunction with the Norwall Automatic Air and Vacuum Valve will prevent air leakage into the radiator through the valves and will convert the ordinary low pressure steam heating apparatus into a combined low pressure and vacuum system of steam heating.

### List Prices of Angle Valve with Union

Stock No. 301

Size.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Rough body { ....	\$3.15	\$3.90	\$4.70	\$6.25	\$8.15	\$13.00
Plated all over { ....						

### List Prices of Corner Valve with Union, Offset Pattern

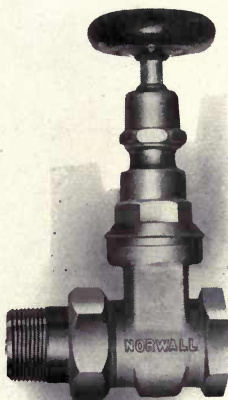
Right Hand, Stock No. 302

Left Hand, Stock No. 303

Size.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Rough body { ....	\$3.45	\$4.25	\$5.15	\$6.95	\$8.95	\$14.25
Plated all over { ....						

# Norwall Packless Gate Valve

Stock No. 304



## Screwed Ends, Right- or Left-Hand Threads

Sizes .....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Rough body, finished trim'gs	\$2 25	\$2 75	\$3 65	4 95	\$ 6 00	\$ 9 25
Finished all over .....	3 75	4 25	5 25	6 55	7 60	12 90
Rough body, plated trim'gs .	2 50	3 00	3 95	5 15	6 25	9 45
Rough body, plated all over.	2 55	3 05	4 00	5 20	6 35	9 60
Finished and plated all over.	4 00	4 55	5 65	6 85	8 00	13 55

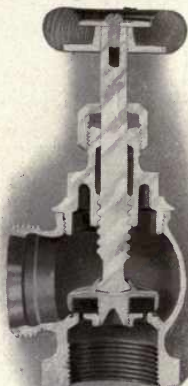
## With Male or Female Unions

Sizes .....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Rough body, finished trim'gs	\$3 20	\$3 75	\$4 80	\$6 40	\$ 8 00	\$11 50
Finished all over .....	4 75	5 30	6 40	8 00	9 45	15 15
Rough body, plated trim'gs .	3 30	3 95	5 10	6 60	8 10	11 70
Rough body, plated all over.	3 40	4 05	5 30	6 75	8 25	11 90
Finished and plated all over.	5 05	5 65	6 95	8 40	10 50	15 85

## Improved Screw-Stem Steam Radiator Valves



With Union  
*Threads—Right-Hand on Union*  
*Right-Hand on Bottom*



Without Union  
*Threads—Right on Side*  
*Right on Bottom*

The improved pattern of steam valve here shown we believe has features of exceptional merit. The valve is faultless in its proportions. The weight has been increased to give sure stability to the points which have to bear the greatest strain. The inner areas of the valves are full size. The method employed of attaching the valve to the stem permits the absolutely tight closing of the valve without grinding. The composition disc is held to the disc holder by a nut, and can be easily removed to enable the replacing of the disc. The adjusting and fitting of the handles makes these important parts durable. We are confident that the valves will meet the most exacting requirements of the Heating Trade. The quality of material used in its construction makes the valve very durable, and in its finish the valve will be found particularly pleasing.

*List Prices, page 144.*

# Improved Screw-Stem Steam Radiator Valves

Price List for Valve, with Union, Jenkins Disc

No.	Size, inches.....	½	¾	1	1¼	1½	2
150	Rough Body, finish'd trim'gs	\$3 00	3 50	4 30	5 85	7 75	12 60
151	Rough Body, plated trim'gs	3 10	3 75	4 65	6 25	8 00	12 85
*152	Rough Body, plated all over	3 15	3 80	4 75	6 40	8 10	13 10
154	Finished Body, pl't'd all over	3 65	4 25	5 25	7 00	9 25	14 35
	Jenkins Discs, extra ....	...	25	30	45	60	90

Price List for Valve, with Union, Brass Disc

No.	Size, inches.....	½	¾	1	1¼	1½	2
160	Rough Body, finish'd trim'gs	\$2 05	2 45	3 25	4 50	6 50	10 00
161	Rough Body, plated trim'gs	2 30	2 60	3 35	4 90	6 65	10 25
*162	Rough Body, plated all over	2 40	2 85	3 65	5 05	7 10	10 85
164	Finished Body, pl't'd all over	2 90	3 40	4 30	5 80	8 10	12 35

Price List for Valve, without Union, Jenkins Disc

No.	Size, inches.....	½	¾	1	1¼	1½	2
155	Rough Body, finish'd trim'gs	\$2 00	2 50	3 20	4 50	6 25	10 50
156	Rough Body, plated trim'gs	2 20	2 70	3 50	4 75	6 50	10 75
157	Rough Body, plated all over	2 30	2 85	3 65	4 90	6 75	11 00
159	Finished Body, pl't'd all over	2 55	3 10	4 00	5 40	7 75	12 25
	Jenkins Discs, extra .....	....	25	30	45	60	90

Price List for Valve, without Union, Brass Disc

No.	Size, inches.....	½	¾	1	1¼	1½	2
165	Rough Body, finish'd trim'gs	\$1 35	1 60	2 25	3 25	4 50	7 00
166	Rough Body, plated trim'gs	1 55	1 85	2 40	3 60	4 85	7 25
167	Rough Body, plated all over	1 65	1 95	2 65	3 70	5 00	7 75
169	Finished Body, pl't'd all over	2 15	2 50	3 25	4 45	6 00	9 25

All Valves threaded as described, unless otherwise ordered.

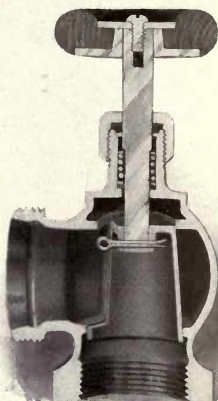
\* This finish regularly carried in stock. Other finishes can be promptly shipped from factory.



# Improved Q. O. Water Radiator Valves



With Union  
Threads—Right-Hand on Union  
Right on Bottom



Without Union  
Threads—Right on Side  
Right on Bottom

The globular form of the body of this new valve assists in doing away with the sticking on the shell. Only a small portion of the shell comes in contact with the body at the top and bottom, and at a narrow vertical strip on either side where a gate is formed for closing the water way. The tapering shell permits of taking up of any wear which may occur in the valve. The spring in the bonnet or neck of the valve holds the conical shell up to its seat and at the same time exerts a downward pressure on the small rubber washer which is slipped over the stem and held within the chamber in the cap of the valve. The pressure of the spring expands the rubber gasket so as to provide a self-packing feature. The weight is heavy and finish unsurpassed.

## Price List, Bonnetless, with Union

No.	Size, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2
140	Rough body, finished trimmings.	\$2 05	2 45	3 25	4 50	6 50	10 00
141	Rough body, plated trimmings...	2 30	2 60	3 35	4 90	6 65	10 25
*142	Rough body, plated all over.....	2 40	2 85	3 65	5 05	7 10	10 85
144	Finished body, plated all over...	2 90	3 40	4 30	5 80	8 10	12 35

## Price List, Without Union

No.	Size.....	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2
145	Rough body, finished trimmings.	1 60	2 25	3 25	4 50	7 00
146	Rough body, plated trimmings ..	1 85	2 40	3 60	4 85	7 25
147	Rough body, plated all over.....	1 95	2 65	3 70	5 00	7 75
149	Finished body, plated all over...	2 50	3 25	4 45	6 00	9 25

All valves threaded as described, unless otherwise specified.

\* This finish regularly carried in stock. Other finishes can be promptly shipped from factory.

The above Valves and all Radiator Valves can be supplied with Lock and Shield as illustrated and listed on page 148 of this book.

NOTE.—Measurements of Valves and Elbows, giving distances from centers, are set forth on page 223.

# Screw-Stem Steam Radiator Valves



WITH UNION

*Threads*—Right-Hand on Union

Right-Hand on Bottom

These Valves are made of best material; metal well distributed; threads carefully cut—a popular valve for steam work.

Price List for Valve, with Union, and Jenkins Disc

No.	Size, inches .....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
70	Rough body, finished trimmings	\$3 50	\$4 30	\$5 85	\$7 75	\$12 60
71	Rough body, plated trimmings	3 75	4 65	6 25	8 00	12 85
*72	Rough body, plated all over....	3 80	4 75	6 40	8 10	13 10
73	Finished body.....	4 00	4 80	6 40	8 75	13 85
74	Finished body, plated all over..	4 25	5 25	7 00	9 25	14 35
	Jenkins Discs, extra. ....	25	30	45	60	90

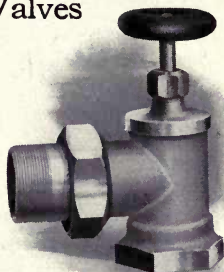
# Quick-Opening Bonnetless Hot-Water Radiator Valves

WITH UNION

*Threads*—Right-Hand on Union.

Right-Hand on Bottom.

These Valves are made without bonnet, body being made in one piece, thus dispensing with one screwed joint and making the Valve correspondingly more tight and durable. The water-way is full and free.

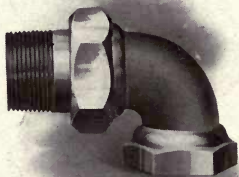


Price List, with Union

No.	Size, inches .....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
99	Rough body, finished trimmings	\$2 45	\$3 25	\$4 50	\$6 50	\$10 00
100	Rough body, plated trimmings..	2 60	3 35	4 90	6 65	10 25
*101	Rough body, plated all over....	2 85	3 65	5 05	7 10	10 85
102	Finished body.....	3 00	3 85	5 25	7 50	11 50
103	Finished body, plated all over..	3 40	4 30	5 80	8 10	12 35

\* Regularly carried in stock; other finishes can be shipped from factory promptly.

# Union Elbows for Water Radiators

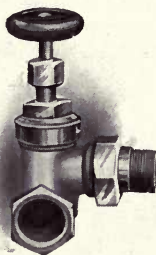


Both Threads Right-Hand  
Price List

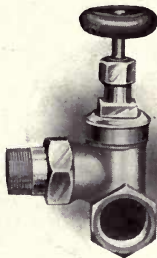
No.	Size, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
130	Rough Body, Plain ....	\$1.50	\$1.75	\$2.25	\$2.95	\$3.70	\$6.00
131	Rough Body, plt'd trm'gs	1.65	1.90	2.40	3.10	3.85	6.15
*132	Rough Body, " all over	1.75	2.00	2.50	3.20	4.00	7.00
134	Finished and " all over	2.25	2.40	3.00	3.90	4.85	8.50

All Ells threaded as above described, unless otherwise ordered.

## Screw-Stem Steam Corner Valves



Right-Hand Valve  
Threaded-Right-Hand on Union  
Right-Hand on Bottom



Left-Hand Valve  
Threaded-Right-Hand on Union  
Right-Hand on Bottom

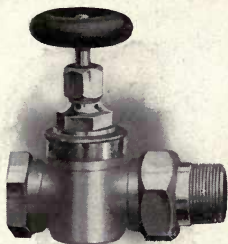
Price List for Valve, with Union and Jenkins Disk

No.	Size, inches. ....	$\frac{1}{2}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
30	Rough body, finished trimmings	\$3.85	\$4.75	\$6.45	\$8.55	\$13.85
31	Rough body, plated trimmings	4.15	5.15	6.90	8.80	14.15
*32	Rough body, plated all over....	4.20	5.25	7.05	8.95	14.45
34	Finished body, plated all over ..	4.85	6.00	7.80	9.95	15.95
	Jenkins Disks, extra.....	.25	.30	.45	.60	.90

All Valves threaded as described, unless otherwise ordered.

\*Regularly carried in stock; other finishes can be shipped from factory promptly. †Can supply  $\frac{1}{2}$ -inch size from  $\frac{3}{4}$ -inch list.

# Straightway Q.-O. Water Radiator Valves



## Threads—Right-hand Both Openings

This valve can be fully opened or closed by one-quarter turn of handle. It must be connected so that the current of water will move in the direction indicated by the arrow on its side.

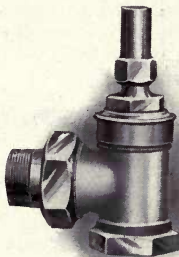
## Price List, with Union

No.	Size, inches . . . . .	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
114	Rough body, finished trim'gs	\$2 45	\$3 25	\$4 50	\$6 50	\$10 00
115	Rough body, plated trimmings	2 60	3 35	4 90	6 65	10 25
*116	Rough body, plated all over .	2 85	3 65	5 05	7 10	10 85
118	Finished body, plated all over	3 40	4 30	5 80	8 10	12 35

All Valves Threaded as described, unless otherwise ordered.

\* This Finish regularly carried in stock ; other finishes can be promptly shipped from factory.

## Lock and Shield for Radiator Valves



All styles of Radiator Valves can be furnished, on special order only, with Lock and Shield. No extra charge.

Keys, extra, plain, each . . . . . \$0 25

Keys, extra, plated, each . . . . . 30

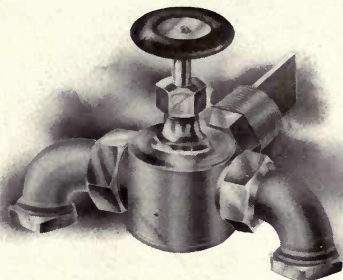
Note.—When ordering specify number and size of Valve, adding the words "Lock and Shield."

Screw Stem and Corner Valves—One key does for  $\frac{3}{4}$ -inch and 1-inch sizes, another for  $1\frac{1}{4}$ -inch and  $1\frac{1}{2}$ -inch sizes, and a third for 2 inches.

Hot Water Valves—One key does for  $\frac{3}{4}$ -inch and 1-inch sizes, another for  $1\frac{1}{4}$ -inch, and a third for  $1\frac{1}{2}$ -inch and 2-inch sizes.

# Ideal Unique Water Radiator Valve

Stock No. 380



This Valve provides an interchangeable flow and return connection at *one end* only of the hot water radiator, and thus wonderfully simplifies water heating outfits. Its use saves fitter's labor, elbow, pipe and fittings otherwise necessary in making connection to return end of the radiator. The use of the Ideal Unique Valve also saves the cutting of joists, and extra cutting and boring of floors so objectionable to architects and owners. This Valve permits location of the radiators in restricted floor space, where it could not go if connected at both ends.

One-sixth of a turn of the handle fully opens or closes the Valve. When the gates are open, all the water is forced to circulate through the radiator. When the gates are closed, the radiator is shut off and the water flows through a by-pass in the Valve body, the *full area* of the pipes. Any radiator may therefore be shut off without preventing a constant circulation throughout *entire* system.

As there is only one connection to make when this Valve is used, measurements and "roughing-in" work can be done with absolute accuracy. If necessary at any time to alter size of the radiator, no repiping is required, no new holes bored, no floors torn up.

The Ideal Unique Valve is made of best materials; all nuts and other parts subject to strain are extra heavy. Both elbows are adjustable so that connections to risers or stubs can be run in any desired direction. A diaphragm extending into the Radiator wholly across the water-way of the first section forces all the water up through the top connections, downward through the other sections, insuring freedom from counter currents and increasing the rapidity of circulation. Thus radiators yield their highest percentage of efficiency when Ideal Unique Valves are used. Send for special circular containing full description and interior views.

## Data and List Prices

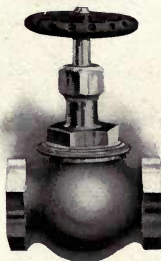
Size, Inches.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$
Center of body to end of spud.....	$2\frac{7}{8}"$	$2\frac{7}{8}"$	$3\frac{1}{8}"$	$3\frac{5}{8}"$
Inside dimensions of couplings to radiators...	$1\frac{1}{4}"$	$1\frac{1}{4}"$	$1\frac{1}{2}"$	$1\frac{1}{8}"$
Distance from center top opening of elbows to bottom of elbows .....	$1\frac{7}{8}"$	$1\frac{7}{8}"$	2"	$2\frac{1}{2}"$
Distance between centers of bottom elbow connections.....	$5\frac{1}{4}"$	$5\frac{3}{4}"$	7"	$7\frac{3}{8}"$
List prices.....	\$4.25	\$5.40	\$5.80	\$7.95



# Screw-Stem Brass Globe Valves

Stock No. 178

Extra Heavy for Steam, Water, Oil or Gas



A joint in the cap permits the repacking of stem without leakage.

These Valves are much heavier and much more thoroughly finished than the ordinary Globe Valves.

Price List for Valve, with Jenkins Disc, Iron Wheel.  
Rough Body—Plain

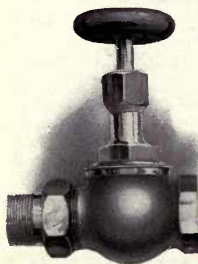
Size, Inches	Price	Size, Inches	Price	Size, Inches	Price
$\frac{1}{8}$	\$1 10	$\frac{1}{2}$	\$1 60	$1\frac{1}{4}$	\$4 00
$\frac{1}{4}$	1 10	$\frac{3}{4}$	2 20	$1\frac{1}{2}$	5 50
$\frac{3}{8}$	1 25	1	2 80	2	8 00

# Screw-Stem Brass Globe Valves

Stock No. 189

*Threads*—Right-hand, Both openings. Rough Body—Plated all over.

Price List, with Union, Jenkins Disc, Wood Wheel



Size, Inches	Price
$\frac{3}{4}$	\$ 3 80
1	4 75
$1\frac{1}{4}$	6 40
$1\frac{1}{2}$	8 10
2	13 10

## I. W. Brass Gate Valves

Stock No. 335

Double Gate, Screwed, without Union



Price List. Rough body, plain

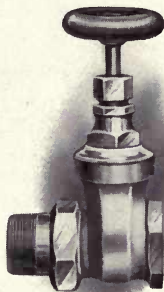
These valves open to the left and have non-rising stems

Size, in.	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
Price, ea.	\$1 30	\$1 75	\$2 50	\$3 50	\$5 00	\$7 50	\$14 00

## W. W. Brass Gate Valves

Stock No. 373

Double Gate, Screwed, with Union

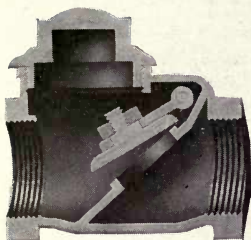


Price List. Rough body, plated all over

Size, inches ....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Price, each .....	\$3 10	\$3 75	\$4 65	\$6 10	\$7 85	\$12 10

## Brass Check Valves

Stock No. 340



The seat of this check is set at an angle of 45 degrees to the center, and the disc being hung on a hinge will therefore close of its own weight. The disc and valve seat are regrinding; by unscrewing the cap you can rotate the disc with a screw-driver or piece of flat iron without disconnecting from pipes. This

can be used as a vertical or horizontal check valve. Furnished with flanges when specially ordered.

### Price List

Size, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Brass valves,scr'd	\$1 50	1 75	2 25	3 25	4 25	6 25	12 00	20 00

## The Ideal Low-Pressure Pop Safety Valve

Stock No. 360

Brass



This is a strictly high-grade article and possesses the genuine popping feature. It is not a mere relief valve. Recommended for pressure not exceeding 20 pounds. Has nickel-plated, extra-heavy iron hexagon bushing connection, on which an ordinary wrench can be used, and which cannot easily be strained or crushed by a heavy wrench.

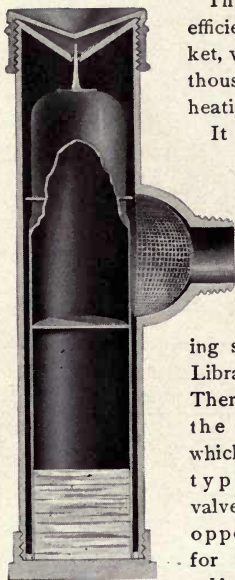
### Price List

Size, inches.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Each.....	\$2 00	3 00	3 60	5 00	6 75	10 60	17 25

# Libra Automatic Air Valve

Stock No. 395

For Venting Steam Radiators

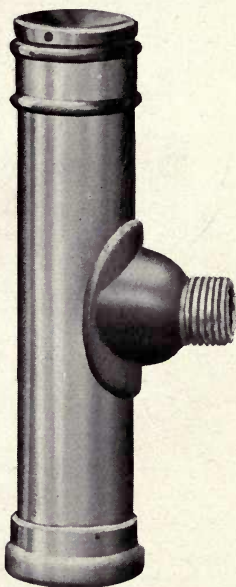


Valve Open

The Libra is the simplest and most efficient automatic air valve on the market, which accounts for its adoption by thousands of particular and successful heating contractors.

It depends for its operation solely upon the use of elements contained in heating system, viz.: Air, Heat, and Water. So extremely sensitive is the action of this valve that the air even to the last atom is removed from the Radiator, thereby giving every foot of heating surface its highest efficiency. The Libra is perfectly noiseless in operation. There are no regulating screws used in the Libra, which in other types of valves furnish opportunity for improper adjustment, resulting in

flooding of floors and damaging of decoration. Labor of adjustment is saved. It is equally efficient on the varying ranges of temperature and pressure of Low Pressure Heating. The valve shell and float are brass; and the pin which seats the valve is of tempered German silver, tapered to a perfect joint. No perishable features. The cap of this valve, which vents on the side, is designed for protection of the seat by preventing the accumulation of dust and other foreign matter. List price each \$1.00.



Valve Closed

# Norwall

## Automatic Air and Vacuum Valves

Stock No. 558

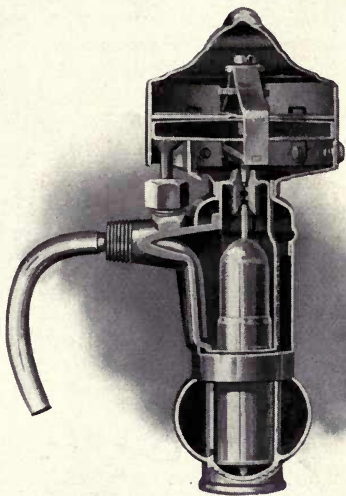
For Low-Pressure Vacuum and Thermostatic Control.

The Norwall Automatic Air and Vacuum Valve can be relied on to do its own work—a trusty adjunct to successful steam heating; very sensitive and instant in action. Operation is same whether pressure is 1 or 10 pounds. No expansion post to buckle or get out of shape—made to work and wear.

Being made entirely of metal, this valve is practically imperishable. It does not wear out or become loose around the seat. Its siphon arrangement takes all water formed from condensed steam back into the radiator. It cannot “sputter” water or blow steam.

The Norwall Automatic Air and Vacuum Valves can be used on any system of Low-Pressure Steam Heating, old or new, and their use on a tight system in conjunction with the Norwall Packless Radiator Valves gives the user an up-to-date vacuum system of steam heating without air lines or cumbersome heating equipment of any kind. Very simple in construction. No adjustment is necessary at any time. The air is the sole expansive force in the action of this valve. Designed for low-pressure heating and when used on every radiator and coil, in conjunction with the Norwall Packless Radiator Valves, the entire system can be operated under vacuum at operator's will.

List price, each, \$4.00





# Norwall Siphon Air Valve

Stock No. 561

The Norwall Siphon Air Valve is always open for the discharge of air from the radiator, yet is always closed tight against water or steam leakage through the valve. It works properly all the time, never sputtering steam or water.

Will automatically vent any radiator, which can be vented manually by a pet cock, of the last vestige of air. Every section is rendered hot.

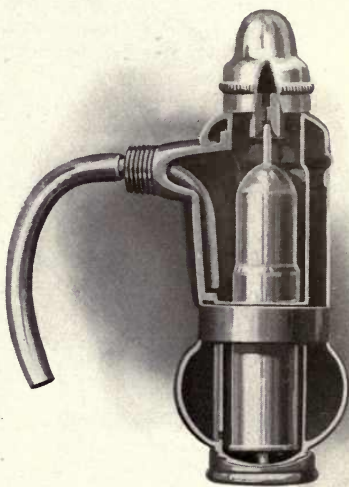
No water leak. The Siphon automatically discharges surplus water into the radiator. No steam leak. Heat acting directly on water and air is the motive force. The air expands and closes the valve the instant steam reaches it.

The construction of the valve insures its perfect action at all times. Should any water come against the valve it closes tightly, but the instant the water in the radiator falls away, the Siphon arrangement discharges all the surplus water in the valve back into the radiator and the valve recommences venting. No matter how many times water or steam may come to the valve, it will instantly close tight, but whenever air reaches it the valve will instantly open.

This operation is entirely automatic. The valve has no expansion post, but depends upon expansion and contraction by heat acting directly on the air and water for its sole motive force.

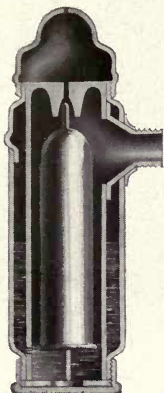
Nothing about it to wear out or get out of order. Made of best steam metal and mechanically perfect. The bottom cap is so fitted that it can easily be removed and the valve cleaned, making it as good as new.

List price, each, \$1.70

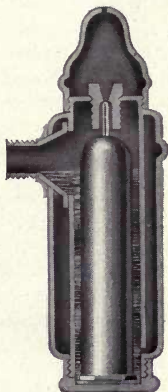


# Norwall and Allen Automatic Air Valves

Made entirely of metal; no expansion post, ring, spring or packing—the expansive force is simply the air. Few parts and requires no adjustment. Especially adapted to exhaust steam heating systems.



Norwall Valve open.



Allen Valve closed.

Patents applied for

They vent every loop in every radiator on which they are placed and work instantly and continuously.

Stock No. 559. Norwall Valve, List price, each \$1.30

Stock No. 560. Allen " " " " \$1.00

## Construction and Operation

Norwall and Allen Valves are about the same, the difference being in the larger, heavier construction of the Norwall. They have a well in the lower part to receive the water condensed from the steam. *A sealed metal float* is placed in this well.

An outer chamber is connected to an inner well by a small hole near the bottom of the inner shell. During the first operation the air passes freely through the valve. When steam enters, it condenses, gradually filling the inner well with water, carrying the sealed metal float to its seat, thus closing the valve. At first, the air in the outer chamber is expanded by the heat, and a portion of it is expelled through the small hole into the inner chamber, thence out through the regular outlet. As the inner chamber fills with water from condensation, the outlet from the outer chamber becomes sealed by the water. As the valve cools when steam goes off the air in the outer chamber contracts and draws the water from the inner chamber, allowing the float to drop, thus opening the valve. When steam again enters the valve, the heat almost instantly expands the air in the outer chamber, forcing the water into the inner chamber, carrying the float to its seat and closing the valve. Action is uniform, whether the pressure is one pound or ten pounds. When the valve cools the contraction of the air in the outer chamber draws the water from the inner chamber, and then draws air through the water, until the chamber is fully recharged.

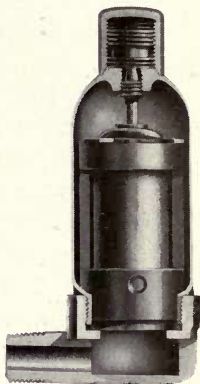
# Imperial Automatic Air Valves

Stock No. 515

They are the best constructed valves on the market in which a sensitive material is used for expansion. The expansion cylinder is far more sensitive and far more durable than the solid expansion posts ordinarily used.

Valve has a baffle plate, which prevents the float from being blown up by sudden pressure. The bottom-piece or well is extra deep, forming a water balance which acts as a siphon in keeping valve free from condensation.

List price, each, \$1.15.

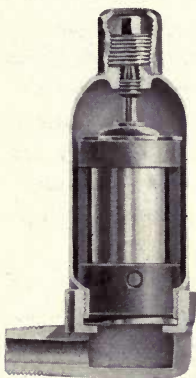


## Imperial Lock-Shield Auto. Air Valve

Stock No. 516

Where it is desired, our regular Imperial Valve can be equipped with lock and shield device at top, as shown in cut, by the mere addition of open cap and lock shield adjusting screw. Our Imperial Valves all have adjustable repacking glands, and will always remain tight. This valve has a special key without which no one can change the adjustment, and accidental flooding of floors and damage to ceilings is prevented. Every valve is guaranteed.

List price, each \$1.35.



# Russell Automatic Air Valves

Stock No. 517

For Steam and Water

Principle of construction is such that all the air is expelled from the radiator or coil, without loss of steam or water. The float contains a liquid extremely sensitive to heat, which vaporizes at 151 degrees Fahrenheit, expanding the corrugated heads, and closing the valve against loss of steam. All parts cast solid and finished on a lathe, which insures free waterways for steam and water. Guaranteed in every respect.



List price, each, \$1.15.

## Imperial Straight Shank Aut. Air Valves

Stock No. 518



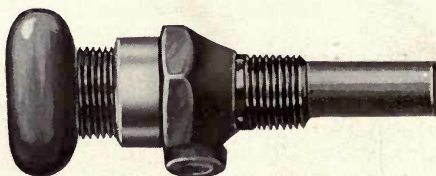
This valve is constructed for coils and indirect radiation. The opening in the base which delivers steam is higher than the opening through which condensation returns, thereby insuring perfect circulation within the valve, and will not become waterlogged. Threaded for  $\frac{1}{8}$ -inch pipe only.

When desired, can furnish the Russell Automatic Straight Shank Valves with  $\frac{1}{4}$ -inch threading.

List price, each, \$1.15.

# Victor Automatic Air Valves

For Use on Dry or Vapor Steam Work



(Style 2 with Wood Wheel.)

List Price Per Doz.

Stock No. 519—Either with Wood Wheel or with Cap .....\$7.50

On wet steam work, Evaporating Cup should be used, which we furnish at an additional price of ten cents each, net.

## Compression Air Valves



List Price Per Doz.

Stock No. 520—Old Style, Wood Wheel, Style 3, Nickel Plated...\$3.00

Stock No. 521—Old Style, Key, Style 4, Nickel Plated..... 3.00



List Price Per Doz.

Stock No. 522—Improved, Wood Wheel, Style 3, Nickel Plated...\$3.00

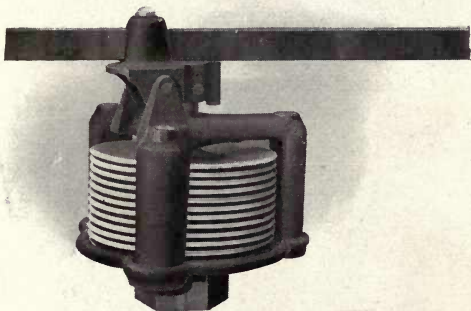
Stock No. 523—Improved, Key, Style 4, Nickel Plated..... 3.00  
Threaded for iron Pipe, size  $\frac{1}{8}$  inch.

Keys, extra, Old or Improved, 5 cents each, net.



# Ideal Sylphon Damper Regulator

For Steam Boilers



(Protected by American and Foreign Patents. U. S. Patents June 2 1903; June 16, 1903; May 24, 1904, and other applications pending.)

It is composed entirely of metal; is frictionless; is sensitive to the last degree; is positive and invariable in its action, and will not deteriorate with age. The simplicity of its construction will be seen in the engraving.

It works just below atmospheric pressure, closing the dampers, if desired, before one ounce of steam pressure is generated. By shifting the counterpoise weight one can change its application from below atmospheric pressure to any pressure desired and maintain good draft control. These facts have been well established by means of a mercury column which records readings in half ounces, and its extreme sensitiveness has been thereby thoroughly proven.

The regulating device is made upon the bellows plan and is formed of two brass discs with accordion sides, made of steam brass of the best quality. The accordion sides are formed of ten deep folds which permit of ample yet very sensitive expansive effect upon the vertical rod that connects the top of the bellows to the bar upon which the counterbalance weight is placed. The sides are not built up of separate discs, but are formed from a single piece of brass so that there are no joints or seams to come loose and cause leakage. It will last as long as the boiler.

## Data and Dimensions

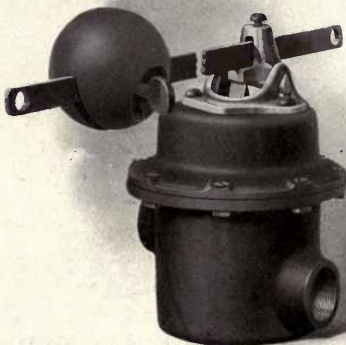
The bellows is fed by a 1-inch opening in the bottom plate  $5\frac{3}{4}$  inches in diameter;  $2\frac{1}{4}$  inches high at rest. The lever is 37 inches long. The lever weight weighs  $5\frac{1}{2}$  pounds. The complete regulator weighs 15 pounds, including all trimmings; shipping weight, boxed, 22 pounds.

This regulator is shipped complete as illustrated, and with 12 feet of No. 0 steel plumbers' chain, four S hooks, and two ceiling pulleys.

No. 22 List price, each \$20.00

# Ideal Sylphon Damper Regulator

For Water Boilers and Tank Heaters



(Protected by American and Foreign Patents. U. S. Patents June 2, 1903; June 16, 1903; May 24, 1904, and other applications pending.)

These Regulators contain no perishable diaphragm, piston cylinder, packing valves or sliding joints. They are absolutely self-contained and require no auxiliary power, such as electricity or compressed air, to aid their operation. They are constructed entirely of metal and therefore never require repacking or new diaphragms as in the case of ordinary regulators.

The slightest change in temperature produces a decided movement in the bellows, and the two knife-edged pivots prevent all friction and permit this movement to be transmitted to the dampers without loss of power. Thus the use of auxiliary power and graduated scales for connecting damper chains, so common in other devices of this class, are not necessary and are not employed in these Regulators.

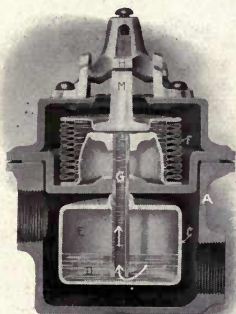
The bellows F is made of seamless brass and the strain caused by the expansion of the fluid inside is equally distributed at all points; there is no possibility of breaking through the bends of the sides by unequal strain.

The counterpoise weight may be set to accurately maintain the degree of water temperature desired. It is a simple, durable and reliable draft Regulator, which will minutely adjust the dampers of a Boiler at the slightest variation of temperature in the water.

NOTE.—When the flow main from the Water Boiler is larger than  $1\frac{1}{4}$  inch, the Regulator is installed by connecting it between the flow and return mains with  $1\frac{1}{4}$ -inch pipings. When the flow main is  $1\frac{1}{4}$  inch or less (frequently the case with Tank Heaters), the Regulator is simply connected direct to the flow pipe.

# Ideal Sylphon Damper Regulators

For Water Boilers and Tank Heaters



## Construction and Operation

The cast-iron outer shell (in accompanying illustration) is divided into two compartments by the partition wall. The lower compartment contains the inside cylinder C, in which a volatile liquid D is sealed hermetically and the vapor therefrom fills the space E above the liquid. The inner cylinder is made of sheet metal having high conductivity for heat, and this enables the slightest temperature variations to quickly penetrate the liquid D from the water of the heating system, which circulates through the space between cylinder C and outer shell A. The upper compartment contains a metal bellows F, which is likewise hermetically sealed, and communicates with the cylinder C through the pipe G, the lower end of which opens close to the bottom of cylinder C. The tilting rocker H on top of the Regulator which carries the damper lever I is pivoted on knife-edge bearings. This rocker is made of gun-metal bronze, while the housing and the plunger M are made of brass, thus furnishing pivotal bearings for the damper lever which possess extreme delicacy and absolute freedom from friction and rust.

As the temperature rises, the vapor in the space E increases in tension, thereby forcing some of liquid D through pipe G into bellows F, as indicated by the arrows in the pipe. This causes the bellows to expand and thrust the plunger M upward to the tilting rocker H, and thus the dampers which are connected to lever I are correspondingly regulated. As soon as the temperature of the water in shell falls slightly, the reverse operation occurs.

Regulators Nos. 42, 43, and 44 are all similar in construction, the only change being in the chemicals (for liquid D in cylinder C) necessary to regulate the heater in accordance with the variations of temperature, running from 120° to 240°.

## Data and Dimensions

Stock No. 42	Regulator, for water temperature running	120° to 180°
Stock No. 43	“ “ “ “ “	160° to 220°
Stock No. 44	“ “ “ “ “	190° to 240°

The number of each Regulator is cast in raised figures on the shell.

Height, 7 inches; diameter 5 inches; weight, complete with lever and counterpoises, 28 lbs.; shipping weight, boxed, 35 lbs. The Regulator is furnished complete, with 12 feet of plumbers chain and 4 S hooks.

List Price, each.....\$25.00

# Powers Temperature Regulators



Reliable and effective Heat Regulators for house-heating boilers; simple in construction, automatic.

The "*thermostat*," located centrally in living-room, operates the "*diaphragm*" at the heater, controlling the draft-dampers GRADUALLY. Will also control natural gas. Positively no batteries or clock-work.

## Price List

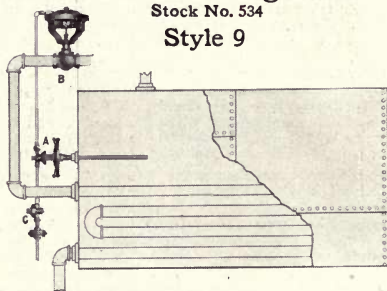
Stock No. 530, Regulator No. 2, for hot-water heater. Regulates heater from living-room .....	\$40 00
Stock No. 531, Regulator No. 3, for low-pressure steam. Regulates heater from living-room .....	45 00
Stock No. 532, Regulator No. 4, for hot-water heaters that <i>boil over</i> . Regulates heater from living-room, also limiting boiler heat at 212° .....	50 00
Stock No. 533, special check dampers. Must be used on smoke-pipe. All sizes to 10-inch .....	1 25
12-inch, \$1.75; 14-inch, \$3.00; 15-inch, \$4.00.	

Send for Trade price list.

## Powers Tank Regulator

Stock No. 534

Style 9



This regulator is used to control a hot-water tank heated by steam-coil. It will hold the water at a uniform temperature, and thereby prevent the annoyance and damage to plumbing consequent upon an over-heated water supply.

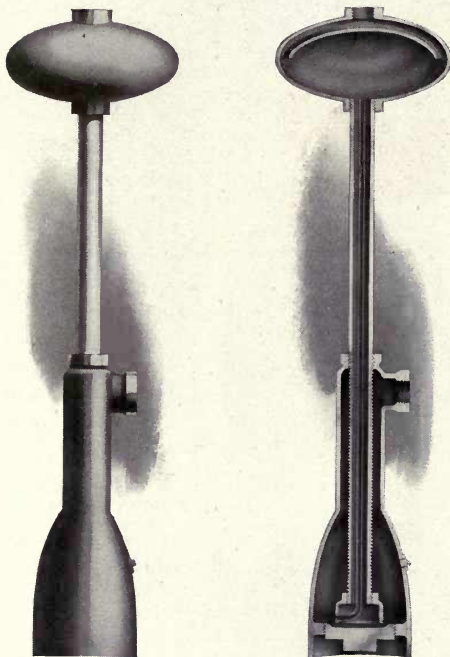
This regulator is constructed to operate at a temperature of 180 degrees Fahrenheit unless otherwise specified. It requires a  $\frac{3}{4}$ -inch tapping in the tank, and must be installed substantially as shown in the cut. Furnished complete with diaphragm steam valve.

## List Prices

Size, 1 inch .....	Each, \$70 00
" 1 $\frac{1}{4}$ " .....	" 75 00
" 1 $\frac{1}{2}$ " .....	" 80 00
" 2 " .....	" 90 00
" 2 $\frac{1}{2}$ " .....	" 95 00
" 3 " .....	" 100 00
" 4 " .....	" 120 00

# Honeywell Heat Generators

For Hot-Water Heating Outfits



These Generators are designed to meet the demand for a device to quicken the circulation in hot water heating jobs. When connected to the piping of an ordinary gravity plant this Generator seals the circuit and permits the generation of a slight pressure up to ten pounds, at which point it relieves itself through the operation of a mercury seal, eliminating the element of danger. The tendencies of this slight pressure are: First, to increase the circulation; second, to widen the range of temperatures to a point equal to that of steam; third, to accomplish an economy in fuel.

The pressure created by this Generator is calculated to force the water through any part of a defective piping system where the circulation is sluggish under ordinary gravity conditions. It is simple to install and is applicable to both old and new heating plants.

Sectional outline view herewith shows mercury seal, connections to system, equalizing pipe and deflecting plate.

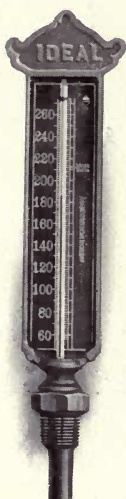
Approximate weights: style 1, 35 lbs.; style 2, 45 lbs.; style 3, 55 lbs.

## List Prices, Each

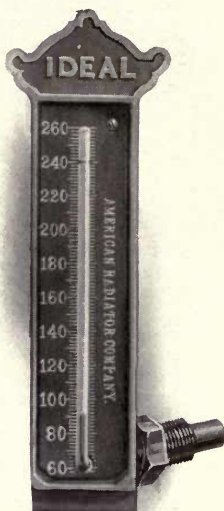
Style 1 (Stock No. 537) for 1,200 square feet .....	\$25 00
Style 2 (Stock No. 538) for 2,500 square feet .....	35 00
Style 3 (Stock No. 539) for 3,500 square feet .....	50 00

# Ideal Hot Water Thermometers

## Separable Mercury Bath



Straight



Angle

No Hot Water Boiler should be without an IDEAL Hot Water Thermometer.

The glass bulb of each instrument is immersed in a Mercury bath, protected by a thin steel tube, so there is little chance of injury.

Stem should be fully immersed in, or subject to a continuous circulation of the hot water, to secure accurate reading.

If thermometer does not face in right direction when screwed up tight, loosen small screw slightly and (without lifting) turn top of frame to desired position, after which tighten small screw.

Each thermometer is sent out carefully packed in a separate wooden box.

Non-boiling colored liquid furnished at same price if desired.

Name on scale free of charge where thermometers are ordered in lots of 25.

	List Price Each
Stock No. 540 Hot Water Thermometer, straight .....	\$5 00
Stock No. 541 Hot Water Thermometer, angle, ( <i>for use on risers, or circulating pipe</i> ) .....	6 00



## Ideal Steam Gauges

Stock No. 577

With Bourdon Spring



Size  $4\frac{1}{2}$  inches, iron case, without back flange; nickel plated rim; silvered dial; without cock. Registering 30 lbs. pressure.

In all respects as regularly supplied on IDEAL Steam Boilers.

These gauges are all equipped with hair-spring tension, so the movement is rendered very sensitive at the lowest pressures under which house-heating

boilers are usually operated—viz., 2 lbs. or less. We can also supply high-pressure gauges (prices on application).

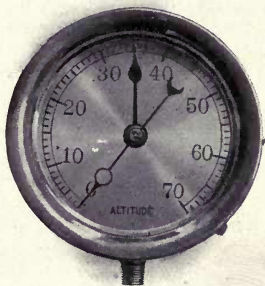
List price, each \$8.00. (Note.)

## Ideal Altitude Gauges

Stock No. 578.

These gauges will indicate accurately, at the boiler, the height of water in the system, and will be found very useful instruments.

**EXPLANATION:** When the water is at its proper level in expansion tank, remove the ring and glass, and set the stationary hand at the pressure indicated by the working hand; whenever the pressure falls below this point, water should be added. Size:  $4\frac{1}{2}$  inches; iron case with N. P. rim; no cock. List Price, each \$8.00. (Note)



## Ideal Pressure and Vacuum Gauges

Stock No. 586

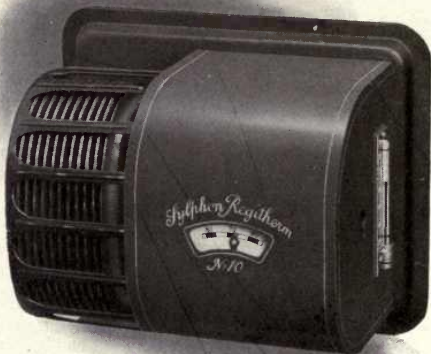
These are same size and general construction as our Steam Gauge. They indicate to 30 lbs. pressure and 30 inches vacuum.

List Price, each \$12.20. (Note.)

**NOTE.**—Name on the dial of all the above gauges free of charge when ordered in lots of 50.

# The Ideal Sylphon Regitherm

Stock No. 600



A Self-Contained Regulator, Automatically Controlling the Temperature at any Desired Point between 60 and 80 Degrees Fahrenheit.

A new automatic temperature regulator which operates in response to the slightest change in temperature. It requires no outside agencies, such as electricity, compressed air, or clock-work to help it perform its functions, but exerts sufficient force within itself to adjust the heating apparatus, either increasing or decreasing the supply of heat. Its range of control is from 60 to 80 degrees Fahrenheit, and it can be set at any desired point within these limits. The fuel saved by this regulator will pay its cost in one or two seasons.

The operation is based on the same principles that govern a thermometer—i. e., the action of heat or cold on a volatile chemical. In the Regitherm is a metal bellows capable of expanding and contracting like a telescope. Within this bellows is sealed, air-tight, a small amount of the volatile liquid. The slightest variation of temperature changes the form of the liquid (expanding by vaporizing, contracting by condensation), hence changes the outward pressure exerted by it. This pressure moves the bellows.

The area of the end wall of the bellows is 30 square inches, so a change of 1 degree in temperature (developing  $\frac{1}{2}$  pound per square inch) creates a force of 15 pounds within the Regitherm. This force expands the bellows  $\frac{1}{2}$  inch and operates a short lever arm attached to a small wire cable, which leads to a balanced lever controlling the dampers of the heater. By this transmission the movement of  $\frac{1}{2}$  inch at the Regitherm is magnified eight-fold at the dampers, giving a wide range of action upon the heater.

Size of instrument (not including mounting board)  $8\frac{3}{4}$  inches wide,  $7\frac{3}{4}$  inches high,  $5\frac{3}{4}$  inches deep. Shipping weight 50 pounds.

Style No. 10, List Price, each.....\$35.00

Send for booklet.

## B. and C. Floor and Ceiling Plates



Floor Plate



Ceiling Plate

These Adjustable Hinged Plates can be put on after work is finished by slipping Plate around pipe, the Ceiling Plate being fastened to pipe by means of screw, and the Floor Plate firmly held by a simple, cleverly contrived spring.

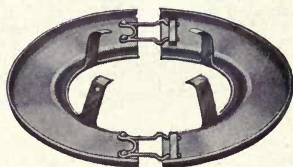
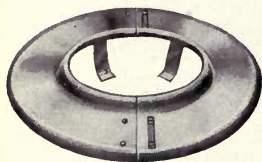
### Price List

Size, inches	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Stock No. 702 Black, each. ..	0.14	0.14	0.18	0.20	0.24	0.28	0.43	0.60
Stock No. 703 Nickel, each...	.25	.25	.28	.32	.35	.38	.52	.75

## Imperial Floor and Ceiling Plates

Stock No. 704

Adjustable, made of spring brass and nickel plated



Easily adjusted to the pipe and will stay firmly in position. Will always hold the nickel.

Size, inches	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
Nickel, each.....	\$0.25	\$0.25	\$0.28	\$0.32	\$0.35	\$0.38	\$0.52

# Russell Floor and Ceiling Plates

Stock No. 700

Adjustable, made of Spring Brass and Nickel Plated



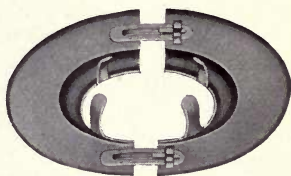
Easily adjusted to the pipe and will stay firmly in position. The holding springs are now perforated for wire, where it is preferred to wire to the ceiling, although the plate will remain firmly on the pipe in any event. Will always hold the nickel. Finished in any color, no extra charge. Any part of plate can be used by cutting to fit with tinner's shears. Send for sample.

Size, inches . . . .	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Nickel, each . . . .	\$0 25	\$0 25	\$0 28	\$0 32	\$0 35	\$0 38	\$0 52	\$0 75

# Ajax Cold-Rolled Steel Plates

Stock No. 701

Adjustable, for Floor and Ceiling



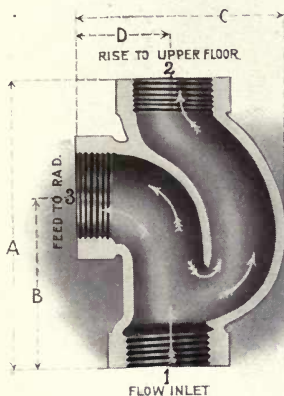
Patented

These plates have a bright, planished finish, resembling nickel plate, but are intended to take the place of black iron plates. Are very strong, may be easily adjusted to the pipe, and will stay firmly in position. Send for sample.

Size, inches . . . .	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Black, each . . . .	\$0 12	\$0 12	\$0 15	\$0 18	\$0 20	\$0 24

# O. S. Distributers

Insure free, positive, uniform circulation. Save labor, fittings and joints, cutting of floors, beams, etc. Prevent friction; no leaks; keeps risers in line.



Positions of tappings are indicated by Figures 1, 2, 3.

## Price List and Dimensions

Stock No.	Tappings, inches			Dimensions, inches				List Price Each
	1	2	3	A	B	C	D	
610	1	x 3/4	x 3/4	3 5/8	2	2 3/4	1 3/8	\$0 60
611	1	x 3/4	x 1	3 3/4	2	2 3/4	1 1/2	60
612	1	x 1	x 3/4	3 3/4	2	2 3/4	1 3/8	60
613	1	x 1	x 1	4	2 1/4	3	1 1/2	60
614	1 1/4	x 1	x 1	4 3/8	2 3/8	3 5/8	2	80
615	1 1/4	x 1	x 1 1/4	4 1/2	2 1/2	3 3/4	2	80
616	1 1/4	x 1 1/4	x 1	4 3/8	2 3/8	3 1/2	2	80
617	1 1/4	x 1 1/4	x 1 1/4	5	2 3/4	3 7/8	2	80
618	1 1/2	x 1 1/4	x 1	4 1/2	2 3/8	3 3/4	1 7/8	90
619	1 1/2	x 1	x 1 1/4	4 3/4	2 5/8	4	2 1/4	90
620	1 1/2	x 1 1/4	x 1 1/4	4 5/8	2 3/8	4	2 1/4	90
621	1 1/2	x 1 1/4	x 1 1/2	4 3/4	2 1/2	3 7/8	2	90
622	1 1/2	x 1 1/2	x 1 1/4	4 3/4	2 1/2	3 3/4	1 3/4	90
623	1 1/2	x 1 1/2	x 1 1/2	5 1/8	2 3/4	4 1/4	2 1/4	90
624	2	x 1 1/4	x 1 1/2	4 3/4	2 1/8	4 1/4	2 1/4	1 20
625	2	x 1 1/2	x 1 1/4	4 3/4	2 1/8	4 3/8	2 1/4	1 20
626	2	x 1 1/2	x 1 1/2	5	2 1/8	4 1/2	2 1/4	1 20
627	2	x 2	x 1 1/4	4 7/8	2 1/2	4 1/2	2 1/4	1 20
628	2	x 2	x 1 1/2	5 1/4	2 1/8	4 1/2	2 1/4	1 20
629	2	x 2	x 2	5 5/8	2 7/8	4 3/4	2 3/8	1 20
630	2 1/2	x 1 1/2	x 1 1/2	5 1/4	2 7/8	4 3/8	2 1/2	2 00
631	2 1/2	x 2	x 1 1/2	5 5/8	3 1/8	5 3/8	2 1/2	2 00
632	2 1/2	x 2	x 2	5 7/8	3 1/8	5 1/4	2 5/8	2 00

Carried in stock in all sections of the country.

Order by number.

## Twin Ells, Cast Iron

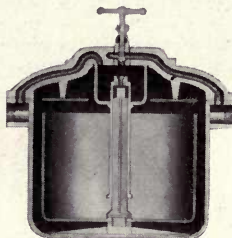
### Use in Place of Branch Headers



No.	Size	Price	No.	Size	Price
973	1 x ¾	\$0.38	978	3 x 2½	\$2.25
974	1¼ x 1	.52	979	4 x 3	3.75
975	1½ x 1¼	.68	980	5 x 3½	6.75
976	2 x 1½	.90	981	5 x 4	6.75
977	2½ x 2	1.50	982	6 x 5	9.75

## Nason's Patent Steam Traps

Stock No. 995



When pressures exceeding 80 pounds are to be used, or if the pressure is always less than 30 pounds, especial note should be made of this fact, in order that the traps may be fitted with valves of smaller or larger area than is common, and otherwise adjusted to their particular work.

### Data and List Prices

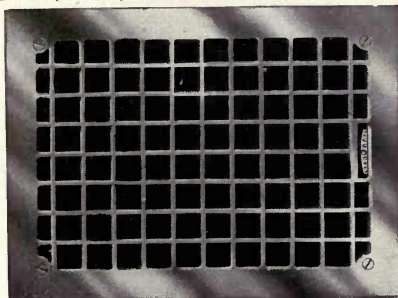
Style .....	1	2	3	4	5
Size Pipe Connection, in.....	½	¾	1	1¼	1½
Diam. Outside of Flanges, in..	10¾	14¼	15¾	19	24¼
Diam. of Cylinder, in.....	8	10½	12	14	18
Height to Top of Valve, in....	11	14	16¼	18½	23½
Height to Top of Cover, in....	8	10	12	14	15½
Max'm Discharge, lbs. per min.	2	5	8	12	20
Greatest No. of sq. ft. surface to which it should be applied	350	900	1400	2000	3500
Greatest No. of Lin. ft. 1-in. Pipe Surface to which it should be applied .....	1050	2700	4200	6000	10500
List Price, each.....	\$16.00	20.00	27.50	42.50	70.00



# Registers and Ventilators

Stock No. 910

Registers, Faces, Borders, for Either Floor or Wall



List Prices, Black Japanned

Size of Opening	Register	Register Face	Floor Border	Size of Opening	Register	Register Face	Floor Border
8x 8	\$ 1.60	1.05	1.20	16x32	31.00	13.10	13.10
8x10	1 65	1.10	1.25	16x36	36.00	16.00	16.00
8x12	1.90	1.30	1.50	18x18	18.50	7.20	7.20
9x12	2.10	1.45	1.65	18x21	20.50	7.75	7.75
10x10	2.35	1.65	1.70	18x24	21.50	8.35	8.35
10x12	2.40	1.70	1.75	18x27	27.50	10.75	10.75
10x14	3.15	2.20	2.20	18x30	31.25	13.25	13.25
10x16	4.85	2.95	2.95	18x36	38.00	17.25	17.25
10x18	6.70	3.70	3.70	20x20	19.75	8.00	8.00
10x20	8.90	4.35	4.35	20x22	21.60	8.40	8.40
10x22	10.40	4.90	4.90	20x24	22.00	8.60	8.60
10x24	12.15	5.35	5.35	20x26	23.50	9.50	9.50
12x12	4.00	2.70	2.70	20x28	28.90	11.50	11.50
12x14	4.35	2.80	2.80	20x30	33.50	13.50	13.50
12x15	4.50	2.90	2.90	20x32	37.50	17.10	17.10
12x16	5.60	3.50	3.50	20x36	43.00	18.50	18.50
12x18	6.80	3.90	3.90	24x24	30.00	12.00	12.00
12x24	12.25	5.50	5.50	24x27	33.95	14.00	14.00
14x14	7.90	4.05	4.05	24x30	38.00	17.25	17.25
14x16	8.50	4.30	4.30	24x32	42.50	18.00	18.00
14x18	9.00	4.50	4.50	24x36	50.00	22.00	22.00
14x20	9.50	4.80	4.80	24x45	67.50	28.50	28.50
14x22	10.50	5.00	5.00	27x27	37.25	17.00	17.00
16x16	11.00	5.10	5.10	27x38	56.00	25.00	25.00
16x18	12.00	5.30	5.30	28x28	44.00	19.00	19.00
16x20	12.35	6.10	6.10	28x30	48.50	21.00	21.00
16x22	14.75	6.70	6.70	28x32	53.00	24.50	24.50
16x24	15.00	7.00	7.00	28x36	64.00	27.00	27.00
16x28	24.60	10.00	10.00	30x30	49.00	21.50	21.50
16x30	27.90	11.00	11.00	30x36	67.50	28.50	28.50

VENTILATORS FOR CORDS—50 cents list extra on sizes up to 14x14, and \$1.00 list extra on sizes above.

# Registers and Ventilators—Continued

Stock No. 910  
Registers, Faces, Borders

List Prices Nickel-Plated, also Bronzed, Gold, Silver, Copper and  
Bronzed Finish

Size of Opening	Register	Register Face	Floor Border
8 x 8	\$ 3.00	\$ 2.45	\$ 2.60
8 x 10	3.15	2.60	2.75
8 x 12	3.65	3.05	3.25
9 x 12	4.00	3.35	3.55
10 x 10	4.35	3.65	3.70
10 x 12	4.40	3.70	3.75
10 x 14	5.25	4.30	4.30
10 x 16	7.20	5.30	5.30
10 x 18	9.45	6.45	6.45
10 x 20	12.00	7.50	7.50
10 x 22	14.50	9.00	9.00
10 x 24	16.25	9.45	9.45
12 x 12	6.35	5.05	5.05
12 x 14	6.85	5.35	5.35
12 x 15	7.00	5.40	5.40
12 x 16	8.25	6.15	6.15
12 x 18	9.55	6.65	6.65
12 x 24	16.30	9.55	9.55
14 x 14	11.00	7.15	7.15
14 x 16	11.50	7.30	7.30
14 x 18	12.00	7.50	7.50
14 x 20	13.00	8.50	8.50
14 x 22	14.50	9.00	9.00
16 x 16	15.00	9.10	9.10
16 x 18	16.20	9.50	9.50
16 x 20	16.55	10.30	10.30
16 x 22	19.50	11.50	11.50
16 x 24	20.00	12.00	12.00
16 x 28	30.80	16.20	16.20
16 x 30	35.00	18.25	18.25
16 x 32	38.25	20.35	20.35
16 x 36	45.00	25.00	25.00
18 x 18	23.75	12.45	12.45
18 x 20	24.75	12.85	12.85
18 x 21	26.00	13.25	13.25
18 x 24	27.75	14.60	14.60
18 x 27	35.00	18.25	18.25
18 x 30	38.00	21.00	21.00
18 x 36	48.50	28.10	26.00
20 x 20	24.75	13.00	13.00
20 x 22	27.60	14.40	14.40
20 x 24	28.20	14.80	14.80
20 x 26	32.00	17.50	17.50
20 x 28	37.40	20.00	20.00
20 x 30	43.00	23.50	23.50
20 x 32	48.50	28.10	26.00
20 x 36	54.00	29.50	28.50
24 x 24	40.00	22.00	22.00
24 x 27	45.00	25.00	25.00
24 x 30	50.00	29.25	28.25
24 x 32	55.50	31.00	30.00
24 x 36	65.50	37.50	34.25
24 x 45	89.50	50.50	40.00
27 x 27	49.25	29.00	28.00
27 x 38	76.00	45.00	36.00
28 x 28	57.50	32.50	31.00
28 x 30	61.50	35.50	32.00
28 x 32	68.00	39.50	35.00
28 x 36	86.00	49.00	37.00
30 x 30	65.00	37.00	34.00
30 x 36	90.00	51.00	41.00

VENTILATORS FOR CORDS—50 cents list extra on sizes up to  
14x14, and \$1.00 list extra on sizes above.

# Registers and Ventilators—Continued

Stock No. 910

Registers, Faces, Borders

List Prices, Electro-Plated, Brass, Bronze or Copper

Size of Opening	Register	Register Face	Floor Border
8x 8	\$ 3.70	\$ 3.15	\$ 3.65
8x10	3.85	3.30	3.90
8x12	4.40	3.75	4.40
9x12	5.10	4.45	5.00
10x10	5.35	4.65	5.20
10x12	5.50	4.80	5.35
10x14	6.55	5.60	6.00
10x16	8.60	6.70	7.20
10x18	11.00	8.00	8.55
10x20	13.80	9.30	9.80
10x22	16.50	11.00	11.00
10x24	18.50	12.00	12.15
12x12	7.90	6.60	7.10
12x14	8.25	6.75	7.35
12x15	8.50	6.90	7.60
12x16	9.75	7.65	8.25
12x18	11.25	8.35	9.00
12x24	18.60	12.10	12.25
14x14	14.30	9.60	10.00
14x16	16.50	11.00	11.00
14x18	18.50	12.00	12.15
14x20	20.50	13.00	12.75
14x22	22.50	14.50	13.50
16x16	19.75	12.80	12.50
16x18	22.25	14.25	13.25
16x20	24.60	16.00	14.00
16x22	28.00	18.00	16.00
16x24	29.60	19.25	17.10
16x28	35.00	22.75	18.80
16x30	37.50	25.00	21.60
16x32	42.00	27.50	22.00
16x36	50.00	33.00	27.00
18x18	26.00	16.50	15.00
18x21	30.00	19.00	18.00
18x24	34.25	22.50	18.75
18x27	39.00	25.50	21.70
18x30	43.00	28.50	22.70
18x36	54.00	36.00	28.00
20x20	32.40	21.20	18.10
20x22	35.70	23.50	19.00
20x24	39.00	25.50	21.70
20x26	42.00	27.50	22.00
20x28	45.50	30.00	24.50
20x30	49.00	32.50	26.00
20x32	52.00	34.00	27.50
20x36	59.00	39.00	31.50
24x24	49.00	32.50	26.00
24x27	56.00	37.00	29.00
24x30	62.00	41.50	32.00
24x32	66.00	44.50	34.00
24x36	74.00	50.30	36.50
24x45	92.00	63.00	45.00
27x27	66.00	44.50	34.00
27x38	94.00	64.00	46.00
28x28	72.00	49.00	36.40
28x30	76.00	52.50	37.00
28x32	84.00	55.00	40.50
28x36	92.00	63.00	45.00
30x30	85.00	56.00	41.00
30x36	102.00	70.00	48.00

VENTILATORS FOR CORDS—50 cents list extra on sizes up to 14x14, and \$1.00 list extra on sizes above.

# Marble Radiator Tops

Stock No. 908

Having had large experience in supplying marble tops for radiators, we can confidently offer to our customers the following carefully selected grades of marble, which we believe to be unequaled for color, finish and quality.

All orders for these marble Tops are executed by shipment direct from the quarries.

## List Prices

KIND OF MARBLE	INCHES THICK		
	$\frac{7}{8}$ or $\frac{3}{4}$	1	$1\frac{1}{8}$ or $1\frac{1}{4}$
Pink Tennessee, per sq. ft.....	\$1.40	\$1.60	\$1.80
Gray Tennessee, per sq. ft.....	1.40	1.60	1.80
Brown Tennessee, per sq. ft.....	1.40	1.60	1.80
Italian (white and Gray streaked), per sq. ft.....	1.60	1.80	2.00

If Ogee edge is ordered, 20 cents per sq. ft. extra, net.

Curved or circular tops, 40 cents per sq. ft. extra. In estimating the superficial area of marble tops there will be charged whatever waste there may be in cutting same out of blocks of marble nearest in size that the quarry may have on hand at the time.

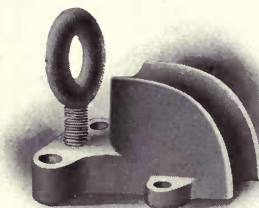
Tops over 6 feet long, in one piece, 80 cents per superficial foot extra.

For each edge polished, add 1 inch to size on tops  $\frac{7}{8}$  inch to  $1\frac{1}{4}$  inch, and add 2 inches to size on tops  $1\frac{1}{2}$  inches to 2 inches thick.

Tops of irregular shape, requiring hand-cutting, subject to extra charge.

We do not carry any marble in stock, hence quote discounts on the foregoing list prices for marble f. o. b. cars, Baltimore, Md., and Knoxville, Tenn.

## Pipe-Bending Forms



This form makes a handy and indispensable fixture for a Pipe Bench. Will not get out of order, —will last a life-time. Has bolt holes so that it can be readily attached to bench. With this Form pipe can be straightened or an offset or quarter bend easily made. It is as necessary to a pipe bench as a vise. Made in two sizes, and has extension eye bolt so that the pipe is held close

to Form, insuring a close and accurate bend.

In making bends in light tubes or nickel-plated pipe a piece of sheet lead, rubber or leather placed on Form and eye-bolt will prevent any finished work from being marred.

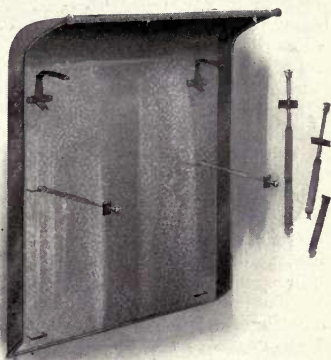
No 689 takes  $\frac{1}{8}$ -to  $1\frac{1}{4}$ -inch pipe; weight, 11 pounds. List Price, \$3.50  
No. 690 takes 1- to 2-inch pipe; weight, 21 pounds. List Price, 4.50

# Ideal Shields without Vapor Pan

Stock No. 906

Either style of IDEAL shields is well adapted to low window radiators over which curtains are hung, especially in houses located in cities in which soft coal is most largely used, and the atmosphere thereby made full of soot.

These shields are neat in appearance and very easily connected or taken off. They do not interfere with the operation of the radiator valves or the air valves, side piece being only 2 inches wide.



Regular Pattern

## List Prices for Regular Pattern

Height of Radiator, inches	26 or lower 5 sec. or less	32 & 38 5 sec. or less	44 5 sec. or less	
Shields from Black Sheets	\$3 00	\$3 20	\$3 40	Radiators larger than 5 sec. add 10c for each additional section.
Shields from Galvanized Sheets	3 60	3 80	4 00	Radiators larger than 5 sec. add 12c for each additional section.
Brass having Galvanized Iron Backs	17 00	17 40	17 60	Radiators larger than 5 sec. add 30c for each additional section.
All Brass	18 00	19 00	19 60	Radiators larger than 5 sec. add 60c for each additional section.
Bl'k P'nt'd or Bronz'd Plain Colors	4 00	14 20	4 40	Radiators larger than 5 sec. add 30c for each additional section.
Galvanized, P'nt'd or Bronz'd Plain Colors	4 60	4 80	5 00	Radiators larger than 5 sec. add 32c for each additional section.

Shields painted to order or to match decorations at extra charge.

In ordering indicate—(1) if Steam or Water Pattern; (2) style of Radiator and height; (3) number and length of sections.

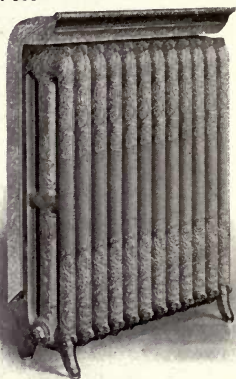
**ORDERS NOT SUBJECT TO CANCELLATION.**

# Ideal Shields with Vapor Pan

Stock No. 906

Contains a removable receptacle for water, thus combining the best features of a dust deflector and a humidifier. Well made with a view to giving first-class service and of excellent style and finish. This shield is very desirable to use in localities where the air is abnormally dry, or in stores wherein delicate merchandise easily affected by dry atmospheric conditions requires an extra humidity.

The vapor pan is of same material as shield. Easily drawn out for refilling or cleaning.



Vapor Pan Patented April 17, 1906.

## List Prices with Vapor Pan

Height of Radiator, Inches	26 or lower 5 sec. or less	32 & 38 5 sec. or less	44 5 sec. or less	
Shields from Black Sheets	\$5 00	\$5 20	\$5 40	Radiators larger than 5 sec. add 10c. for each additional section.
Shields from Galvanized Sheets	5 60	5 80	6 00	Radiators larger than 5 sec. add 12c. for each additional section.
Brass having Galvanized Iron Backs	19 00	19 40	19 60	Radiators larger than 5 sec. add 30c. for each additional section.
All Brass	20 00	21 00	21 60	Radiators larger than 5 sec. add 60c. for each additional section.
Bl'k P'nt'd or Bronzed Plain Colors	6 00	6 20	6 40	Radiators larger than 5 sec. add 30c. for each additional section.
Galvanized, P'nt'd or Bronz'd Plain Colors	6 60	6 80	7 00	Radiators larger than 5 sec. add 32c. for each additional section.



Showing Vapor Pan withdrawn

Shields painted to order to match decorations at extra charge.

In ordering indicate:—

1. Steam or Water pattern.
2. Style of Radiator and height.
3. Number and length of sections.

ORDERS NOT SUBJECT TO CANCELLATION.



# Ideal Bronze, Liquids and Primer



After many years of experiment and experience we have at last been successful in obtaining a grade of bronze powder exactly suited to the decorating of AMERICAN RADIATORS. *It lustres like loosened gold.* The bronze is our own direct importation, and a single trial will convince you of the exceptional brilliancy and durability of its lustre, and the very large amount of surface per pound it will cover.

We earnestly believe that the use of a superior quality of bronze in the decorative treatment of Radiators adds greatly to the popularity of heating apparatus among home-lovers.

Bronze Powder is put up in screw-top tin cans containing one pound. Aluminum is also put up in one-half pound cans. GOLD BRONZE, STOCK No. 652. COPPER AND SILVER BRONZE, STOCK No. 653. ALUMINUM BRONZE, STOCK No. 654. COLOR BRONZE, STOCK No. 655.

No. 646 IDEAL BRONZING LIQUID; and IDEAL BRONZE PRIMER No. 651 in gallon, half-gallon, quart and pint patented stopper cans.

## DIRECTIONS FOR USE

**BRONZE**—Use Ideal Bronze Primer for all colors. Do not attempt to bronze any surface without first applying a coat of Primer. Mix bronze into as much liquid as you will use immediately, sufficient to make it about the consistency of cream. Apply with a fitch brush (bear hair)—do not work it any more than necessary with the brush—cover surface, if possible, with one stroke of brush. Applying bronze when radiators are warm improves the lustre.

**LIQUID**—Keep the liquid can closed tight when not in use. Liquid left uncorked a very short time evaporates and thickens, and becomes worthless. Do not get any bronze in liquid-can, as the smallest particle will turn it green. Liquid if properly used, will not have to be thinned. Do not use a dirty mixing pot or brush, and see that all dried-up bronze is carefully removed before mixing fresh. One pound of bronze (except aluminum) will cover about 300 square feet of radiation; one pound of aluminum powder will cover about 600 square feet of radiation. One quart of liquid is required for each pound of bronze powder, except in the case of aluminum, for which the proportion is about one gallon of liquid to one pound of the powder.

## Black Asphaltum

Stock No. 647

For the painting of boilers and risers, we offer a Black Asphaltum of great covering capacity and durability, put up in one-gallon and half-gallon cans and in barrels of 30 gallons.

First class covering in every respect. Gives A-1 satisfaction to all who use this kind of varnish.



## Ideal Maroon Gloss Japan

Stock No. 648

We also offer an excellent quality of these goods in gallon, half gallon, quart and pint cans. This Japan has been thoroughly tested and proven to be first class in every regard.



### Directions for Use

This Maroon Gloss Japan settles in a very short time. Is easily stirred if liquid is poured off and the pigment loosened with a putty knife, then gradually adding the liquid again. *The more thoroughly* the liquid is stirred the better will be the result. Thin with turpentine and apply with ordinary flat bristle varnish brush.

One coat is sufficient for Radiator work. No priming is required; has high gloss, quite equal to Enamel.

# Ideal Radiator Enamels

Stock No. 650

Send for Color Card



To artistically, yet simply, decorate the heating apparatus is frequently a most effective advertisement for the contractor.

We invite attention to our line of clear, rich-hued IDEAL Radiator Enamels (send for sample tint card). The tints offered are delicate yet bright, and by mixing one color with another almost any fashionable shade may be secured to harmonize with the draperies, wall paper or other furnishing of artistic homes. The Enamels are made after our own formula, and we highly recommend them for covering quality and durability.

Colors regularly carried in stock, in gallon, half-gallon and quart cans are :

Alabaster,	Light Drab,	Silver Gray,	Terra Cotta,
Oak Brown,	Ebony (or black),	Blue Tint,	Bronze Green,
Gobelin,	Apple Green,	Cream,	Sea Green,
	Nile Green.		

Gloss finish is regularly carried by us in stock except Ebony, which we supply in Flat finish only. Flat finish in other than Ebony color is supplied only on special order.

## Directions for Use

**ENAMELS:** Radiators should be painted with one coat of Ideal Enamel Primer and one or two coats of Enamel. Stir Enamel thoroughly and apply with an ordinary flat bristle varnish brush. If it thickens add a little turpentine—too much will kill the lustre. Be sure to remove all oil or grease from surface of radiator before applying, or Enamel will peel off. Do not flow it on too heavily—two thin coats are far better than one thick. One gallon will cover about 250 square feet of surface. *Caution:* Enamel should be applied when radiator is *cold*, and heat should not be turned on for at least 24 hours thereafter.

## Ideal Enamel Primer

Stock No. 651

Our specially prepared Primer should be used to secure best results. It is especially valuable for use as the first coat before applying Enamel. It acts as a filler and furnishes a smooth surface upon which to apply the finishing coat. Supplied in same size cans as Enamel.

# Ideal Iron Cement

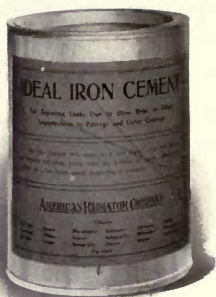
Stock No. 660

IDEAL Cement is a metallic compound in dry, powder form, ground extremely fine, which when mixed with water to a consistency of thick paste and allowed to dry a few hours, becomes as hard as iron, absolutely insoluble in oil or water and proof against intense heat.

It can be quickly and easily applied to fill any imperfection or fracture, and when hardened it matches the metal in color, and *will not chip out.*

IDEAL Cement is designed for use in filling up and smoothing over all blowholes in fittings, pipings, castings, etc. It is ordinarily applied by the use of a stick or common putty knife.

Put up in 1-, 5-, 10-, 25- and 50-pound cans.



# Frazer's Non-Corrosive Pipe Joint Paste

Stock No. 662

Frazer's Pipe Joint Paste has been adopted by us only after thorough investigation. It contains a large percentage of Mi-ca and is far better for the requirements of steam, water and gas fitting, and is cheaper than white or red lead. The latter soon harden and make it extremely difficult to remove or disconnect a fitting which has been in place for a length of time.

Where Frazer's Pipe Joint Paste is used a fitting may be removed with ease after years of service.

Frazer's Pipe Joint Paste retains its pasty form indefinitely; it resists heat and cold, acids and alkalies, and by its use absolutely air-tight joints may be made.

Put up in 1-, 5-, 10-, and 25-pound cans; also half-barrels and barrels.



# Radiator Brushes

Stock No. 641

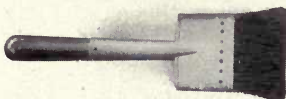


The brush illustrated above is specially designed for use on radiators, the shape being such that it will pass between the sections, cleaning surfaces which could not otherwise be reached. These brushes are thoroughly well made, and very serviceable.

List price, each . . . . . \$0.75

# Ideal Fitch Brushes

Stock No. 642



We are prepared to furnish best grade Fitch Brushes in any size desired.

**Note**—Never put a Fitch Brush in water, as this causes the block or handle to swell and split. Brushes may be kept in best of condition by immersing in bronzing liquid, turpentine, enamels, etc.

# Ideal Boiler Brushes



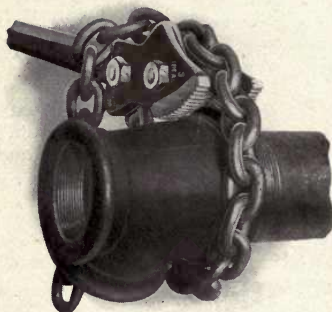
1904	Export	Oval	Round
4½" x 4" x 1¾"	6" x 4½" x 2¾"	2¾" x 4" x 1"	2-", 2½-", 3-" or 4-" diameter

For uses and list prices on the above Flue Brushes, see page 210.



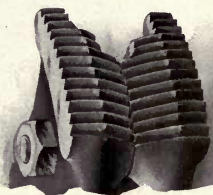
# The Ideal Chain Wrench

Stock No. 900



This Wrench is made with two drop forge jaws having a double row of biting surfaces. It will grip pipe, fittings, flanges, round, square, or irregular castings—easily, quickly—just where the grip is needed. The two outer surfaces will bite and grip pipe or flat surfaces, while the two inner surfaces will take hold of the beads of fittings, or edges of valves, flanges, etc. No one-sided gripping—always takes hold with both

jaws. The lock takes the chain so firmly and surely that there is no slipping out and the chain does not fall out of the lock. Handle is made of spring steel, and handle and the parts are extra strong and will not bend, pull apart, or break. Very simple—only four main parts and two bolts. Ordinary cable chain which can be bought at any hardware store is used. If a link breaks, by pulling out the bolt which holds the chain, discarding broken link and reattaching, the Wrench is again quickly ready for work. Jaws easily tempered and sharpened when necessary. Very durable and reliable. Send for circular and discounts.



The Double-Faced Jaws

## Measurements and Weights

Number of Wrench .....	2	3	4	5
Capacity, size pipe .....	$\frac{1}{2}$ to $3\frac{1}{2}$	1 to 5	2 to 8	$2\frac{1}{2}$ to 12
Capacity, size fittings . . .	$\frac{1}{2}$ to 3	1 to 4	2 to 6	$2\frac{1}{2}$ to 10
Size of Cable Chain .....	3-8	13-32	1-2	19-32
Length of Wrench .....	27 in.	38 in.	49 in.	61 in.
Weight of Wrench. . . . .	10 lbs.	18 lbs.	28 lbs.	50 lbs.

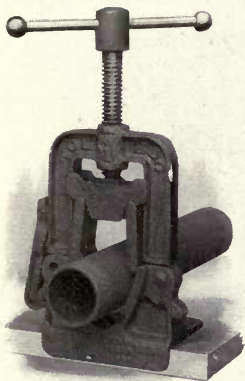
## List Prices

Wrench, with Cable Chain	\$6 00	\$8 00	\$11 00	\$16 00
Wrench, with Flat Chain..	6 90	9 20	12 65	18 40
Jaws, per pair.....	3 25	4 50	5 85	7 50
Handles, each .....	2 10	3 25	4 75	6 90
Cable Chains, each.....	95	1 20	1 70	3 00
Flat Chains, each .....	2 00	3 00	4 00	6 00
Steel Pins, each.....	15	20	25	30
Bolts, each .....	20	25	30	35



# No. 1 Toledo Pipe Vise

Stock No. 996



Holds securely any size pipe from  $\frac{1}{8}$  inch to  $2\frac{1}{2}$  inches diameter; Valves, Tees, Ells, or any other irregular-shaped fitting.

Thoroughly well constructed of malleable iron. The upper jaw consists of a yoke traveling in the side guides and hinged to the screw at the top with a ball and socket joint.

Suspended from this yoke are the two upper jaws, each playing in a free joint. These jaws when screwed down upon any object, adjust themselves to grip according to the surface presented.

On the left-hand side is a snap catch holding the upper and lower parts of the vise together. The vise may be adjusted so that this snap catch will operate on the right-hand side, if desired. This catch

can be instantly released and the work quickly adjusted.

Nothing about the Toledo Pipe Vise will drop out, work loose, or get out of order. The upper jaws cannot drop off. The lower jaws are part of the base casting.

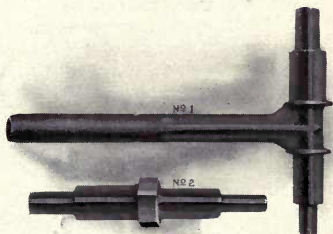
The gripping surfaces are  $1\frac{3}{4}$  inches wide, the upper jaws are drop-forged from tool steel, tempered, and will hold brass or nickel-plated pipe without marring or stripping it. It holds any fitting allowing  $\frac{1}{4}$  inch gripping surface, thus permitting work flush with the grip.

14 inches high,  $8\frac{1}{2}$  inches wide, and has an iron bench flange 4 inches wide. Weight 17 pounds.

List price, \$10.00

## Ideal Spud Wrench

These tools are most convenient for connecting up union radiator valves or union elbows. Connections can be made up quicker, tighter and without injuring the union. Style 1 is used hand-to, and has an open hexagon on end of handle for adjusting bolt nuts. Style 2 is used with a Stillson wrench. Either tool embraces  $1\frac{1}{2}$ -,  $1\frac{1}{4}$ -, 1- and  $\frac{3}{4}$ -inch sizes.



Style 2  
Stock No. 591

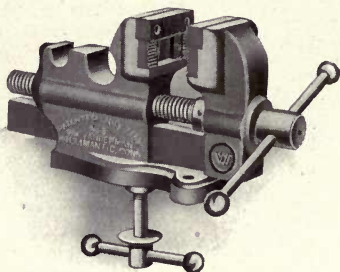
Style 1  
Stock No. 590

List Prices, each: Style 1, \$0.75; Style 2, \$0.50

# Combination Bench Pipe Vise

Three Combinations in One

Constructed with Steel Sliding Bar



No. 672 Vise

Holds pipe from  $\frac{1}{8}$  inch to 10 inches, with bending forms for bending pipe up to 2 inches.

A combination pipe vise, to be useful and practical, must admit of each part of the combination being independent of the other. The combinations in the "Combination Vise" are independent of each other and do not conflict. It is a perfect vise and has more advantages than any other vise in the market. It is strongly made and the parts made to duplicate, and will give satisfaction. The sliding bar, screws, handles, and jaws are made of steel, and all the parts have been put to and have stood the severest tests.

No. 670 holds pipe from  $\frac{1}{8}$  inch to  $2\frac{1}{2}$  inches, with bending form for bending pipe up to 1 inch.

No. 671 holds pipe from  $\frac{1}{8}$  inch to 7 inches, with bending form for bending pipe up to  $1\frac{1}{2}$  inches.

No. 672 holds pipe from  $\frac{1}{8}$  inch to 10 inches, with bending form for bending pipe up to 2 inches.

No. 670	Combination	Bench	Vise,	Wt. 40 lbs.,	List,	\$15.00
No. 671	"	"	"	" 90 "	"	20.00
No. 672	"	"	"	" 160 "	"	30.00

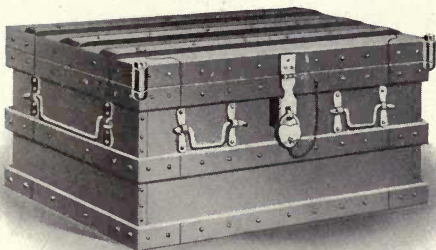
Special jaws for holding brass pipe, extra charge.

For a set of two jaws, to take brass pipe from  $\frac{1}{2}$  to 2 inches, for No. 670 or No. 671 Vise, \$2.00 net.

For a set or two upper jaws, to take brass pipe from  $\frac{1}{2}$  to 2 inches, for No. 672 Vise, \$2.50 net.

For a set of four lower jaws, to take brass pipe from  $\frac{1}{2}$  to 2 inches, for No. 672 Vise, \$4.00 net.

# Steel Tool Chests



Style "A"

Made from 1-16 inch cold rolled sheet steel with malleable iron corner pieces and hardwood braces; fitted with heavy wrought iron hinges and hasp, with cover so arranged as to be held open by support from the back of chest. Each chest is furnished with a first-class brass lock and two keys, and bolts to screw down cover at front corners. They are lighter and cheaper than any first-class make of wood chest, and will outwear several wood chests. They are painted, well proportioned and ornamental in design, and make a first-class tool chest for Steam Fitters, Gas Fitters, Plumbers and other trades where a light and strong tool chest is required. In four types.

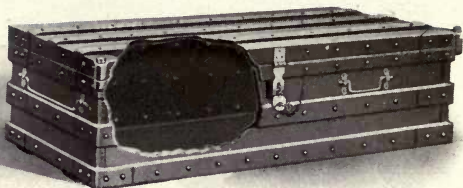
## Style A.—With One Drawer

	List
No. 673, 11 in. deep, 12 in. wide, 24 in. long, weight 60 lbs.	\$12.50
No. 674, 14 in. deep, 15 in. wide, 30 in. long, weight 95 lbs.	17.00
No. 675, 16 in. deep, 17 in. wide, 36 in. long, weight 125 lbs.	19.00
No. 676, 19 in. deep, 20 in. wide, 42 in. long, weight 155 lbs.	22.00

## Style A.—With Two Drawers

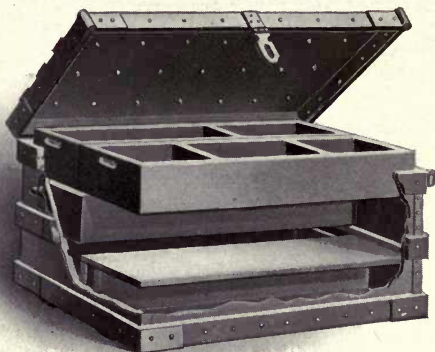
	List
No. 677, 11 in. deep, 12 in. wide, 24 in. long, weight 60 lbs.	\$13.00
No. 678, 14 in. deep, 15 in. wide, 30 in. long, weight 95 lbs.	18 00
No. 679, 16 in. deep, 17 in. wide, 36 in. long, weight 125 lbs.	20.25
No. 680, 19 in. deep, 20 in. wide, 42 in. long, weight 155 lbs.	23.50

## Steel Tool Chests



Style "C"

	List
No. 681, 11 in. deep, 12 in. wide, 30 in. long, weight 70 lbs.	\$12.50
No. 682, 11 in. deep, 12 in. wide, 36 in. long, weight 105 lbs.	15.00
No. 683, 11 in. deep, 12 in. wide, 42 in. long, weight 140 lbs.	17 00
No. 684, 11 in. deep, 12 in. wide, 48 in. long, weight 180 lbs.	20.00



Style "D"

	List
No. 685, 11 in. deep, 12 in. wide, 24 in. long, weight 80 lbs.	\$15.50
No. 686, 14 in. deep, 15 in. wide, 30 in. long, weight 120 lbs.	21.00
No. 687, 16 in. deep, 17 in. wide, 36 in. long, weight 155 lbs.	23.00
No. 688, 19 in. deep, 20 in. wide, 42 in. long, weight 185 lbs.	26.00

# Ideal Burring Reamers

For Pipe 1-8 to 2 in.

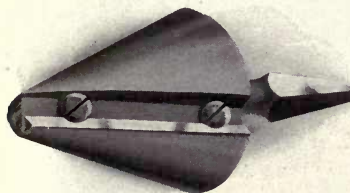


No. 984, Diameter from 0 at point, to  $\frac{5}{8}$  in. at largest part. Length of fluting  $\frac{5}{8}$  in. For pipe  $\frac{1}{8}$  to  $\frac{1}{2}$  in. Each \$0.50. Postage on single reamer, \$0.06.

No. 985, Diam. at point  $\frac{7}{16}$  in. Diam. at largest part  $1\frac{1}{4}$  in. Length of fluting  $1\frac{9}{16}$  in. For pipe  $\frac{1}{2}$  to 1 in. Each \$1.25. Postage on single reamer, \$0.08.

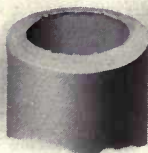
No. 986, Diam. at point  $1\frac{3}{8}$  in. Diam. at largest part  $2\frac{1}{8}$  in. Length of fluting  $1\frac{1}{2}$  in. For pipe  $1\frac{1}{4}$  to 2 in. Bit-brace Shank. Each \$3.50. Postage on single reamer, \$0.24.

For Pipe  
1-2 to 2 in.



No. 987, Diam. at point  $\frac{7}{16}$  in. Diam. at largest part  $2\frac{1}{4}$  in. Length of cutter  $2\frac{5}{8}$  in. Price complete, \$2.25. Extra Cutters, each, \$0.12. Postage on single reamer, \$0.25.

The single cutting blade, set in the hardened steel holder, cuts smoothly, steadily and easily, taking an even chip like a plane without digging in, catching and sticking. This cutter being triangular in shape (three cutting edges) may be



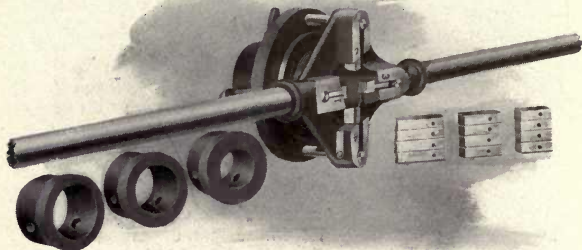
Before Burring



After Burring

turned twice, presenting each time a fresh edge to the work, and it may also be shifted lengthwise for the same purpose. Cutters can be renewed at price above quoted.

# The Toledo Pipe-Threading Devices



Adjustable Threader No. 1

## Adjustable Threading Devices

With No. 1 Device one man can thread 2-inch pipe easily with one hand. No. 1-A stock is adapted for threading pipe in contracted places, otherwise inaccessible—as against walls, between floors or beams and in ditches. No. 1-A is the same as No. 1 machine, except with ratchet attachment.

### List Prices

No. 1 (Stock No. 565) Capacity 1 to 2-inch pipe, inclusive, each	\$24.00
No. 1-A (Stock No. 566) Capacity 1 to 2-inch pipe, inclusive, with Ratchet, each.....	30.00
Extra Dies (Stock No. 570), 1, 1¼, 1½ or 2-inch, per set of 4 pieces .....	2.50

## Geared Adjustable Threading Devices

With No. 2 Device one man can thread 2½ inches of pipe in one minute; 3 inches in 1½ minutes; 3½ inches in 4 minutes; 4 inches in 6 minutes. With Nos. 3 and 4 *one man alone* can thread any size of pipe from 4½ to 12 inches, inclusive.

### List Prices

No. 2 (Stock No. 567) Capacity 2½ to 4-inch pipe, inclusive, each.....	\$100.00
No. 3 (Stock No. 568) Capacity 4½ to 8-inch pipe, inclusive, each.....	300.00
No. 4 (Stock No. 569) Capacity 9 to 12-inch pipe, inclusive, each,	500.00

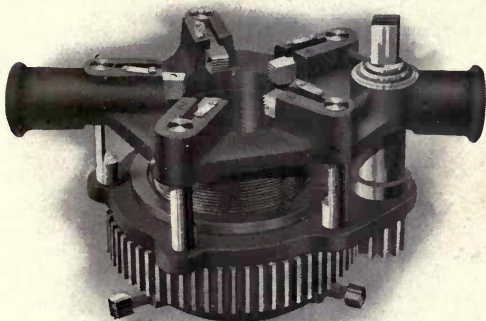
Weight: No. 2, 60 lbs.; No. 3, 190 lbs.; No. 4, 225 lbs.

### Extra Dies

No. 2 (Stock No. 570) 2½, 3, 3½, and 4 inches, set of 5 pieces	\$ 8.00
No. 3 (Stock No. 570) 4½, 5, 6, 7, and 8 inches, set of 5 pieces	12.00
No. 4 (Stock No. 570) 9, 10, and 12 inches, set of 5 pieces.....	20.00



# The Toledo Pipe-Threading Devices

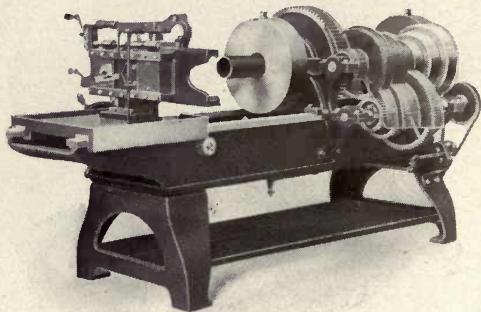


**Geared Adjustable Threader No. 2**

These threading-machine tools do away with all superfluous friction and thereby guarantee large savings in labor. They are especially valuable to the steam-fitter because even the larger sizes of pipe may be threaded by hand "on the job" instead of by power in the shop. Several years of practical tests have thoroughly proven that one man can do more work with this machine than with any other.

The area of the cutting surface of the dies and the number of teeth are reduced to a minimum; the points of the teeth do all the cutting, while the remaining surface presented to the pipe easily removes any burrs without additional friction. The dies may be repeatedly reground until they are reduced to half of their original surface without interfering with the standard size of the threads cut. There is a gradual expansion of the dies as the threads are cut, thus insuring a thread of standard taper without the binding and friction which makes threading machines of other makes so difficult to operate. The harder the pipe, the greater the labor saved. Extremely simple and very durable. Dies may be changed at a moment's notice. No lock nuts, cams or concealed parts to gum up or clog with chips. Send for booklet describing taper pin and other important features. See Lists on opposite page.

# Borden Power Pipe-Threading Machine



This Threading Machine is a first-class investment for the progressive Heating Contractor, as it enables him to quickly cut and thread pipe and nipples for his jobs at first hand, and much time saved during the rush Fall months. The Contractor can thus do his own pipe threading and cutting accurately according to piping plans, at lower costs, and save the time necessary to send this work outside. Spare time can be put in during quiet seasons making nipples or threading pipe for other fitters—the Machine more than “pays its way” all the year around.

These Machines are built in heavy types and are designed to do the most rapid work with longest durability. Each Machine has one set of solid adjustable quick-opening dies, rotary oil pump, cutting off attachment and countershaft.

The quick-acting Lever Chuck grips pipe of same size without stopping the Machine, while the Universal Chuck Machines are designed for frequent changes in pipe sizes.

The beds are extra long, allowing the die stand to travel 20 inches in each of the Machines, so that several nipples or short lengths of pipe may be threaded and cut off without chucking. No nipple holders needed for threading short nipples.

## List Prices

Size A (Stock No. 550)	½ to 2-in., with Universal Chuck.....	\$350.00
“ “ “ “	with Quick-Acting Lever... 450.00	
Size E (Stock No. 551)	1 to 4-in., with Universal Chuck.....	640.00
“ “ “ “	with Quick-Acting Lever... 775.00	

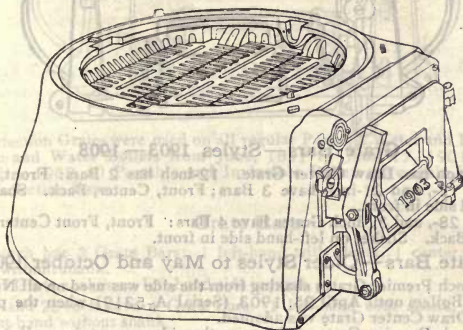
# How to Order Boiler Parts

To assist our customers to order Grate Bars and other castings which may be required for IDEAL Round Boilers, we present herewith various lists and erection data, together with outline illustrations of Bases and Grates of the old and new style Round Boilers.

To avoid confusion or error in executing orders, we request that the following detailed information (as far as the specifications can be readily secured) should be sent with orders for the parts desired:

- |                                 |   |
|---------------------------------|---|
| 1—Name or sketch of part.       | 5—Number on brass plate of fire door.             |
| 2—Pattern number cast on part.  | 6—Date of original purchase.                      |
| 3—If grate bar, state position. | 7—Name of dealer who originally purchased Boiler. |
| 4—Name and number of Boiler.    |   |

## Arco Base and Grate Parts



All Regular Arco Boilers are equipped with the Arco Base. No changes have been made up to the present time except in location of draft inlet.

### Grate Bars

19- and 22-inch have three Bars: Front, Center, Back. Shakes on left side, front.

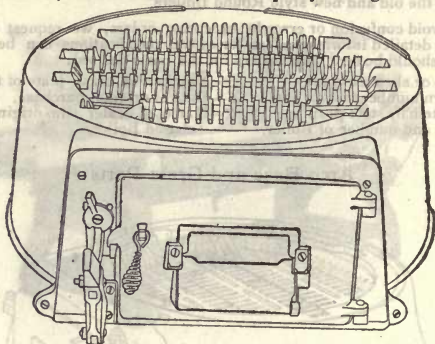
25-, 28-, 31-, and 34-inch have four Grate Bars; Front, Front Center Rear Center, Back. This Grate shakes on left-hand side in front.

### List Prices—Arco Base and Grate Parts

Size of Grate.....	19-in.	22-in.	25-in.	28-in.	31-in.	34-in.
Base Casting only...	\$14.00	\$16.25	\$22.00	\$24.50	\$29.50	\$39.00
Base Front Frame...	2.25	3.00	3.25	4.00	4.25	5.50
Base Door.....	1.00	1.25	1.50	1.50	1.75	1.75
Base Butterfly Door,	.50	.50	.50	.75	.75	.75
Grate Ring.....	5.25	6.75	7.25	9.00	10.00	12.50
Front Grate Bar....	1.75	2.25	2.25	3.00	3.75	4.50
Center Grate Bar...	2.50	3.00	3.00	4.25	5.25	6.75
Back Grate Bar.....	1.75	2.25	2.25	3.00	3.75	4.50
Connecting Bar.....	.60	.75	1.00	1.00	1.00	1.00
Connecting Arm....	.60	.60	.60	.60	.60	.75
Angle Lever.....	.60	.60	.60	.60	.75	.75
Shaker Handle.....	1.00	1.00	1.00	1.00	1.50	1.50

## Premier Base and Grate Parts

All regular Premier Boilers are equipped with this Base and Grate. Also used on regular Portable Steam Boilers April 19, 1901, to March 1, 1902, and all regular Portable Water and Invincible Steam and Water Boilers, June 17, 1901 to March 1, 1902. Specify Catalogue No. of Boiler.



### Grate Bars—Styles 1903—1908

10-inch has Draw Center Grate. 12-inch has 2 Bars: Front, Back. 15-, 18-, and 21-inch have 3 Bars; Front, Center, Back. Shaker on left-hand side in front.

24-, 28-, and 32-inch Grates have 4 Bars: Front, Front Center, Rear Center, Back. Shaker on left-hand side in front.

### Grate Bars—Older Styles to May and October 1903

10-inch Premier Grates shaking from the side was used on all No. 101 Premier Boilers until April 25, 1903, (Serial A-5319) when the present type of Draw Center Grate was adopted.

12-inch Premier Grate shaking on the side was used on all 12-inch Premier Boilers until May 12, 1903, (Serial A-5419) when the present style of Premier Grate shaking in front was adopted.

15-inch Junior Grate shaking on the side was used on all 15-inch Premier Boilers until October 29, 1903, (Serial A-5125) when the above style of Premier Grate was used, till the 1908 pattern was adopted.

18-inch Junior Grate shaking on the side was used on all 18-inch Premier Boilers until May 23, 1903 (Serial No. 5067) when the above style of Premier Grate was used, till the 1908 pattern was adopted.

21-, 24-, 28-, 32-inch—No changes on Grates until the 1908 pattern.

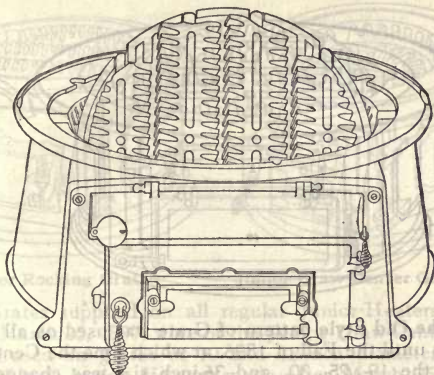
### \* List Prices — Premier Base and Grate Parts

Size of Grate, Inches	10	12	15	18	21	24	28	32
Base Casting .....	3.50	9.50	13.25	14.25	17.25	21.00	23.75	31.00
Base Front Frame .....		1.75	2.00	2.00	2.25	2.25	2.50	3.00
Base Door .....	.60	1.00	1.00	1.00	1.25	1.50	1.50	2.00
Base B'fly Door .....		.40	.50	.50	.50	.50	.60	.60
Base Top Ring .....			2.25	2.75				
Grate for Cent. Slide	1.25							
Grate Center Slide ..	.40							
Front Grate Bar ....		1.00	1.50	1.75	2.25	2.25	3.00	4.50
Center Grate Bar ....			1.75	2.50	3.00	3.00	4.25	6.75
Back Grate Bar .....		1.00	1.50	1.75	2.25	2.25	3.00	4.50
Connecting Bar .....		.40	.60	.60	.75	1.00	1.00	1.25
Connecting Arm .....		.40	.60	.60	.60	.60	.60	.75
Angle Lever .....		.60	.60	.60	.60	.60	.75	.75
Shaker Handle .....	.40	.75	1.00	1.00	1.00	1.00	1.00	1.50

\* See page 207 for prices 1908 pattern Premier Grate.



# Perfection Base and Grate Parts



Perfection Grates were used on all regular Portable Water and Invincible Steam and Water Boilers from June, 1897 to June 17, 1901. After March 1, 1902, all Portable and Invincible Boilers were again fitted with the Perfection Base.

## Grate Bars

19-inch has 3 Grate Bars: 1 left-hand with shank, 1 center, 1 right-hand without shank.

This Grate shakes on left-hand side in front.

21- and 25-inch have 4 Grate Bars: 1 left-hand with shank, 2 center, 1 right-hand without shank.

This Grate shakes on left-hand side in front.

30- and 36-inch have 4 Grate Bars: 1 left-hand with shank, 2 center, 1 right-hand with shank.

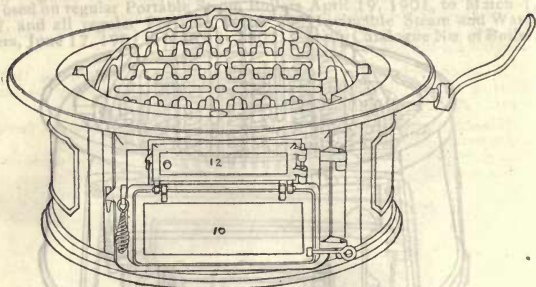
This Grate shakes in two halves in front.

## List Prices—Perfection Base and Grate Parts

Size of Grate, Inches .....	19	21	25	30	36
Base Castings, only.....	\$ 14.25	\$ 18.00	\$ 19.50	\$ 22.00	\$ 37.00
Base Top Ring, wide*.....	8.50	9.00	11.50	14.00	16.25
Base Top Ring, narrow .....	3.75	4.25	5.25	6.50	9.00
Grate Ring .....	3.00	4.00	4.50	7.00	9.00
Base Door .....	1.25	1.25	1.25	1.50	1.50
Base Butterfly Door .....	.50	.50	.75	.75	.75
Right-Hand Grate Bar.....	1.25	1.25	1.75	3.50	6.00
Left-Hand Grate Bar .....	1.50	1.50	2.00	3.50	6.00
Center Grate Bar, each.....	2.50	2.25	3.00	5.00	8.25
Grate Connecting Bar, each.	.50	.75	.75	.50	.75
Base Front Frame .....	1.75	1.75	2.25	3.00	3.50
Base Front Extension*.....	2.25	2.50	2.75	3.25	3.75
Clinker Door .....	.50	.60	.75	.75	.75
Shaker Handle .....	1.25	1.25	1.25	1.25	1.25

\* Used on Portable Steam Boilers only.

## Old Style Base and Grate Parts



The Old Style pattern of Grate was used on all Portable Boilers until the Fall of 1896, at which time the Center-Grate Bar of the 19-, 25-, 30-, and 36-inch size was changed somewhat. This type of Grate was discontinued in June, 1897.

### Grate Bars

The Old Style Grate shakes at the side of the Boiler. It consists of the following bars:

19-, 21-, 25-inch have 5 bars: 2 Outside Bars, 2 next to Center Bars, 1 Center Bar with spindle.

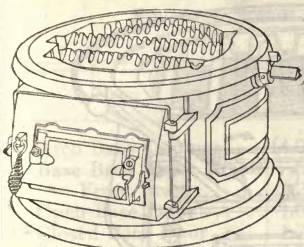
30-, 36-inch have 7 Bars: 2 Outside Bars, 2 next to Outside Bars, 2 next to Center Bars, 1 Center Bar with spindle.

### List Prices—Old Style Base and Grate

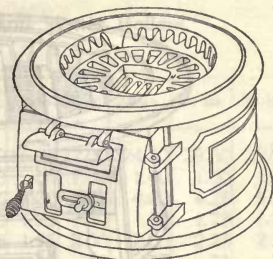
Size of Grate	19-in.	21-in.	25-in.	30-in.	36-in.
Base Bottom Plate.....	\$1.50	\$ 2.50	\$ 3.00	\$ 4.25	\$ 8.00
“ “ Ring.....	4.75	5.25	7.75	11 00	15.50
“ “ Front Panel.....	2.00	2.25	3.00	3.25	3.75
“ Back Panel.....	2.25	2.25	3.00	3.50	4.50
“ Right-Hand Panel.....	2.00	2.25	2.75	3.50	3.50
“ Left-Hand Panel.....	2.25	2.50	3.00	3.25	4.25
“ Top Ring (Water Boilers)	4.25	5.00	6.00	7.75	11.00
“ “ “ (Steam “ )	9.00	11 00	13.50	17.75	22.25
Grate Ring .....	3.50	4.00	5.75	7 75	9.25
Ashpit Door .....	1.00	1.25	1.50	1.50	1.75
Clinker Door .....	.60	.60	.60	.60	.60
Butterfly Door .....	.60	.60	.75	1.00	1.00
Shaker Handle .....	.75	.75	.75	1.00	1.00
Outside Grate Bar .....	1.00	1.50	2.00	2.00	3.00
Next to Outside Grate Bar .....				3 25	4.50
Next to Center Grate Bar .....	1.50	1 75	3.25	3.50	5.25
Center Grate Bar .....	1.75	2.00	3.50	3.75	5.25
Grate Connecting Bar .....	1.50	1.50	1.75	2.50	3.25
Shaking Spindle .....	.60	.60	.60	.75	.75
Dumping Spindle .....	.40	.40	.40	.40	.40



# Junior Base and Grate Parts



Junior Rocking Grate



Junior Draw-Center Grate

The Grates supplied on all regular Junior Heaters made prior to March 25, 1897, were of the Junior Draw-Center pattern, still used on grates of 10- and 12-inch diameter. All regular 15-inch Junior Heaters made after March 25, 1897 (Serial No. 514) and 18-inch Heaters made after March 27, 1897, were supplied with the present style of Junior Rocking pattern, consisting of three bars.

## Grate Bars

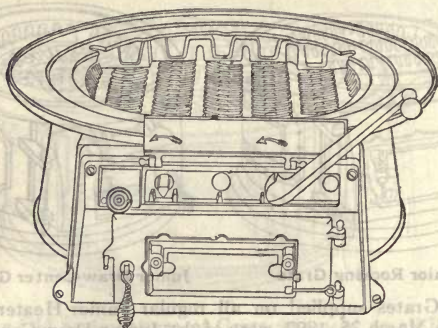
10- and 12-inch Grates have Draw-Center Bars. This Grate shakes in front of the Heater.

15- and 18-inch have Junior Rocking Grate with three bars: Front, Center, Back. This Grate shakes at the side of the Heater.

## List Prices Junior Base and Grate Parts

Size of Grate, Inches ..	10	12	15	18
Base Legs.....	\$ .25	\$.....	\$.....	\$.....
Base Bottom .....	2.00	3.50	4.00	6.75
Base Panels, each .....	.....	1.00	1.25	1.50
Base Casting .....	3.50	.....	.....	.....
Base Top Ring .....	.....	2.75	4.00	4.50
Base Front Frame .....	.....	.75	1.25	1.75
Base Door .....	.60	.75	1.00	1.50
Base Door Slide Damp'r .....	.40	.40	.....	.....
Base Butterfly Door... ..	.....	.....	.40	.40
Shaker Door .....	.40	.60	.....	.....
Circular Slide Grate... ..	1.25	1.25	.....	.....
Grate Center Slide .....	.40	.60	.....	.....
Front Grate Bars .....	.....	.....	1.00	1.50
Shaker Grate Bar .....	.....	.....	1.75	2.25
Back Grate Bar .....	.....	.....	1.00	1.50
Grate Connecting Bar .....	.....	.....	.40	.60
Shaker Handle .....	.40	.40	.60	.60

# Triangular Grate and Base Parts



Triangular Grates were used on all regular Portable Steam Boilers from June, 1897, to January 16, 1899 (Serial M-1 to M-1342).

## Grate Bars

- 19-inch has 3 Grate Bars: All of same length.
- 21-inch has 4 Grate Bars: 2 long and 2 short.
- 25- and 30-inch have 5 Grate Bars: 3 long and 2 short.
- 36-inch has 6 Grate Bars: 4 long and 2 short.

## Price List—Triangular Grate and Base Parts

Size of Grate, Inches.....	19	21	25	30	36
Base Casting.....	\$14.75	\$17.75	\$23.25	\$31.00	\$39.00
Base Extension (for Portable Steam Boilers only).....	2.75	3.25	3.75	4.50	5.00
Base Front Frame.....	1.75	1.75	2.25	3.00	3.50
Base Door.....	1.25	1.25	1.25	1.50	1.50
Base Clunker Door.....	.60	.60	.60	.60	.60
Base Butterfly Door.....	.40	.40	.40	.40	.40
Grate Bar, long.....	2.50	3.25	3.75	6.00	7.25
Grate Bar, short.....	.....	2.50	3.00	4.75	5.75
Grate Bar Front Support.....	.75	1.00	1.25	1.50	1.50
Grate Bar Journal Plate.....	1.50	1.75	2.25	2.75	3.25
Grate Bar Gear Wheel.....	.40	.40	.40	.60	.60
Grate Bar Gear Collar.....	.40	.40	.40	.40	.40
Shaker Handle.....	1.00	1.00	1.00	1.00	1.00

## Important to Observe in Ordering

As stated on page 13, orders are executed more promptly when the following detailed information accompanies the order:—

- 1—Name or sketch of part.
- 2—Pattern number cast on part.
- 3—Position of Grate Bar.
- 4—Name and number of Boiler.
- 5—Number on brass plate on door.
- 6—Date of purchase.
- 7—Name of dealer who originally purchased the Boiler.

# Round Boiler Parts

For Arco Steam and Water Boilers

Name of Part	19-in.	22-in.	25-in.	28-in.	31-in.	34-in.
Arco Base Castings.....	14.00	16.25	22.00	24.50	29.50	39.00
*Base Back Draft Frame	.50	.50	1.00	1.00	1.00	1.00
“ Front Frame.....	2.25	3.00	3.25	4.00	4.25	5.50
Open Base Door.....	1.00	1.25	1.50	1.50	1.75	1.75
*Closed Base Door.....	1.75	1.75	2.00	2.00	2.25	2.25
Base Butterfly Door...	.50	.50	.50	.75	.75	.75
Front Grate Bar.....	1.75	2.25	2.25	3.00	3.75	4.50
Center “ “.....	2.50	3.00	3.00	4.25	5.25	6.75
Back “ “.....	1.75	2.25	2.25	3.00	3.75	4.50
Connecting “.....	.60	.75	1.00	1.00	1.00	1.00
“ Arm.....	.60	.60	.60	.60	.60	.75
Angle Lever.....	.60	.60	.60	.60	.75	.75
Grate Ring.....	5.25	6.75	7.25	9.00	10.00	12.50
Shaker Handle.....	1.00	1.00	1.00	1.00	1.50	1.50
Base, Complete.....	31.00	37.00	46.00	55.00	65.00	85.00
Fire Pot.....	51.00	70.00	80.00	100.00	115.00	148.00
Fire Door Frame	1.50	2.00	2.00	2.00	2.00	2.00
“ “ and Lining..	1.50	2.25	2.25	2.50	2.50	2.50
Clinker Door Frame.	.60	.75	1.00	1.25	1.25	1.25
“ “ and Lining	.60	.75	.75	1.00	1.00	1.00
Arco Single Section	16.00	21.00	25.00	32.00	38.00	42.00
“ Double “.....	28.00	40.00	48.00	64.00	74.00	85.00
“ Steam Dome.....	33.00	43.00	54.00	64.00	72.00	90.00
“ Water “.....	15.00	22.00	25.00	32.00	45.00	54.00
C.O. Door Frame(narrow)	1.00	1.00	1.00	1.25	1.25	1.50
“ “ and Lining “	1.50	1.75	1.75	1.75	2.00	2.25
“ “ Frame (med'm)	1.25	1.50	1.75	1.75	1.75	1.75
“ “ and Lining “	2.25	2.75	3.00	3.25	3.25	3.50
“ “ Frame (wide)	1.50	2.25	2.25	2.50	2.50	3.00
“ “ and Lining “	3.00	3.75	4.25	4.50	4.50	4.75
Smoke Hood, Complete	3.75	4.50	4.50	7.50	7.50	9.00
Nipple, Push.....	2½"	3"	4"	4"	5"	5"
	.60	.60	.60	.60	.60	.60

\*Formerly used on Arco Steam Boilers.

# Round Boiler Parts

## For Standard Water Boilers

Name of Part	15-in.	17-in.	19-in.	22-in.	25-in.	28-in.	31-in.	34 in.
Base Casting.....	\$10 00	\$11.75	\$14.00	\$16.25	\$22.00	\$24.50	\$29.50	\$39.00
Base Front Frame.....	1.75	2.00	2.25	3.00	3.25	4.00	4.25	5.50
Base Door.....	1.00	1.00	1.00	1.25	1.50	1.50	1.75	1.75
Base Butterfly Door..	.50	.50	.50	.50	.50	.75	.75	.75
Grate Ring.....	3.75	4.25	5.25	6.75	7.25	9.00	10.00	12.50
Front Grate Bar.....	1.00	1.50	1.75	2.25	2.25	3.00	3.75	4.50
Front Center Grate Bar.	1.50	1.75	2.50	3.00	3.00	4.25	5.25	6.75
Back Center Grate Bar.....			2.50	3.00	3.00	4.25	5.25	6.75
Back Grate Bar.....	1.00	1.50	1.75	2.25	2.25	3.00	3.75	4.50
Connecting Bar.....	.60	.60	.60	.75	1.00	1.00	1.00	1.00
Connecting Arm.....	.60	.60	.60	.60	.60	.60	.60	.75
Angle Lever.....	.60	.60	.60	.60	.60	.60	.75	.75
Shaker Handle.....	.75	.75	1.00	1.00	1.00	1.00	1.50	1.50
Base Complete.....	21.00	25.00	31.00	37.00	46.00	55.00	65.00	85.00
Fire Pot.....	43.00	46.00	50.00	64.00	77.00	96.00	111.00	115.00
Fire Door Frame.....	1.50	1.75	2.25	2.25	2.25	2.25	2.25	2.25
Fire Door and Lining.....	1.50	1.75	1.75	1.75	2.00	2.50	2.50	2.50
Clinker Door Frame.....	.75	.75	.75	1.00	1.25	1.25	1.25	1.25
Clinker Door and Lining.....	.60	.60	.60	.75	.75	1.00	1.00	1.00
Inside Section.....		12.00	13.50	17.50	21.00	27.00	32.00	37.00
Outside Section.....	8.75	11.50	13.50	17.50	21.00	27.00	32.00	37.00
Water Dome.....	9.00	12.00	13.00	17.00	20.00	26.50	31.00	35.50
1 Sec. C. O. Door Frame.....	.75	.75	.75	1.00	1.00	1.25	1.25	1.25
1 Sec. C. O. Door and Lining.....	.75	.75	.75	.75	.75	1.00	1.00	1.00
2 Sec. C. O. Door Frame.....	1.00							
2 Sec. C. O. Door and Lining.....	1.00							
3 Sec. C. O. Door Frame.....		1.25	1.50	1.75	1.75	2.00	2.00	2.00
3 Sec. C. O. Door and Lining.....		1.50	2.00	3.00	3.00	4.00	4.00	4.00
4 Sec. C. O. Door Frame.....		1.50	1.50	2.00	2.00	2.75	2.75	2.75
4 Sec. C. O. Door and Lining.....		3.00	3.00	4.00	4.00	4.50	4.50	4.50
Bottom ½ Smoke Hood.....	.60	.60	.75	.75	1.00	1.25	1.50	1.50
Top ½ Smoke Hood.....	.60	.75	1.00	1.00	1.25	1.50	1.50	1.75
Smoke Hood Slide Damper.....	.60	.60	.75	1.00	1.50	1.50	1.50	1.75
Ch'k Draft Door Frame.....	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Check Draft Door.....	.40	.60	.60	.60	.60	.60	.60	.60
Push Nipples, each.....	3" .60	3" .60	3" .60	4" .60	4" .60	5" .60	5" .60	6" .70



# Round Boiler Parts

For Premier Steam and Water Boilers, 1900-1908.

Name of Part	15 In.	18 In.	21 In.	24 In.	28 In.	32 In.
Base Castings.....	13.25	14.25	17.25	21.00	23.75	31.00
Base Top Ring .....	2.25	2.75	.....	.....	.....	.....
Front Grate Bar .....	1.50	1.75	2.25	2.25	3.00	4.50
Center Grate Bar .....	1.75	2.50	3.00	3.00	4.25	6.75
Back Grate Bar .....	1.50	1.75	2.25	2.25	3.00	4.50
Connecting Bar .....	.60	.60	.75	1.00	1.00	1.25
Connecting Arm .....	.60	.60	.60	.60	.60	.75
Base Front Frame .....	2.00	2.00	2.25	2.25	2.50	3.00
Base Door .....	1.00	1.00	1.25	1.50	1.50	2.00
Butterfly Door .....	.50	.50	.50	.50	.60	.60
Angle Lever .....	.60	.60	.60	.60	.75	.75
Shaker Handle .....	1.00	1.00	1.00	1.00	1.00	1.50
Base Complete .....	25.00	27.50	30.00	37.00	44.00	62.00
Fire Pot .....	49.00	72.00	74.00	91.00	110.00	136.00
Fire Door Frame .....	1.50	1.50	1.50	1.50	1.75	1.75
Fire Door and Lining ..	.75	.75	1.50	1.75	2.25	2.75
Clinker Door Frame ....	.60	.60	1.00	1.00	1.00	1.25
Clinker Door and Lining	.60	.60	1.00	1.00	1.00	1.00
Narrow closed section...	.....	12.50	21.00	25.00	34.50	48.50
Narrow open section .....	.....	.....	16.50	18.50	28.75	37.00
Wide open section .....	.....	.....	30.00	35.50	46.00	57.00
Screw Nipple .....	5" 1.50	5" 1.50	6" 1.75	6" 1.75	8" 2.00	8" 2.00
Section Ring Complete..	2.00	2.25	3.00	3.25	4.50	5.00
Steam Dome .....	21.00	27.00	50.00	60.00	78.00	94.00
Water Dome .....	12.50	18.00	28.00	36.00	46.00	59.00
Deflector Damper .....	.75	.75	1.50	1.50	2.50	2.50
Smoke Hood Complete .	3.25	3.25	5.50	5.50	9.00	9.00

## For Portable Water Boilers

Name of Part	19 In.	21 In.	25 In.	30 In.	36 In.
Fire Pot .....	41.00	51.00	61.00	73.00	91.00
First section over Fire Pot...	20.00	25.00	33.00	48.00	62.00
Other intermediate Sections.	18.00	22.00	29.00	39.00	57.00
Dome Section .....	19.00	24.00	30.00	40.00	58.00
Fire Door Frame .....	2.00	2.00	2.00	2.00	2.00
Fire Door .....	1.00	1.00	1.00	1.00	1.25
Fire Door Lining .....	.75	.75	1.00	1.00	1.00
Clean-out Door Frame .....	.75	.75	.75	.75	.75
Clean-out Door .....	.40	.40	.40	.40	.40
Smoke Hood Complete .....	2.25	2.25	3.50	3.50	4.50
Push Nipple .....	3" .60	4" .60	4" .60	5" .60	6" .70

# Round Boiler Parts

For Portable Steam Boilers

Name of Part	19-in.	21-in.	25-in.	30-in.	36-in.
Fire Pot.....	42.00	53.00	61.00	75.00	92.00
First Section over Fire Pot.....	27.00	34.00	43.00	64.00	85.00
Other Intermediate Sections.....	24.00	30.00	39.00	56.00	76.00
Dome.....	37.00	45.00	62.00	82.00	110.00
Fire Door Frame.....	3.50	3.75	5.00	5.00	6.00
“ “.....	1.00	1.00	1.25	1.25	1.50
“ “ Lining.....	.75	.75	.75	.75	1.00
2-Section Boiler Front Frame.....	5.00	5.25	6.50	7.25	.....
3- “ “ “ “.....	5.50	6.50	7.75	8.25	11.25
4- “ “ “ “.....	.....	7.25	9.00	9.25	13.75
5- “ “ “ “.....	.....	.....	.....	.....	15.00
Narrow Cleanout Door Frame.....	1.50	1.75	2.25	2.25	2.50
“ “ “ “.....	.40	.40	.40	.40	.40
Wide “ “ “ Frame.....	3.00	3.00	3.50	3.75	4.50
“ “ “ “.....	1.00	1.00	1.25	1.25	1.50
Bottom Panels, each.....	1.75	2.25	2.50	3.25	4.00
“ “ C.O. Door, each ..	.40	.40	.40	.40	.40
Lower Wide Panels, each.....	1.50	2.00	3.25	4.00	4.50
Center Narrow Panels, each.....	1.00	1.00	1.25	1.50	2.75
“ Wide “ “.....	.....	1.75	2.25	3.25	4.00
Top “ “ “ “.....	1.50	2.00	2.50	3.00	4.00
Dome Top Flue Strips, each.....	.50	.60	.60	.75	.75
“ Side “ “.....	.40	.40	.40	.40	.40
Direct Draft Damper.....	.60	.60	.75	1.00	1.50
Smoke-Hood, Complete.....	9.00	11.75	14.00	18.25	26.00
Push Nipples, each.....	3".60	4".60	4".60	5".60	6".70

## For Invincible Steam and Water Boilers

Name of Part	19-in.	21-in.	25-in.	30-in.	36-in.
Fire Pot.....	42.00	53.00	61.00	75.00	92.00
First Section over Fire Pot.....	27.00	34.00	43.00	64.00	85.00
Other Intermediate Sections.....	24.00	30.00	39.00	56.00	76.00
Dome, Steam.....	37.00	45.00	62.00	82.00	110.00
“ Water.....	22.00	27.00	38.00	54.00	68.00
Fire Door Frame.....	2.00	2.00	2.00	2.00	2.00
“ “.....	1.00	1.00	1.00	1.00	1.25
“ “ Lining.....	.75	.75	1.00	1.00	1.00
Clean-Out Door Frame.....	.75	.75	.75	.75	.75
“ “.....	.40	.40	.40	.40	.40
Smoke-Hood, Complete.....	2.25	2.25	3.50	3.50	4.50
Push Nipples, each.....	3".60	4".60	4".60	5".60	6".70



# Water Heater Parts

## For Ideal Junior Tank Heaters

Name of Part	10-in.	12-in.	15-in.	18-in.
Base Legs, each.....	\$ .25	\$.....	\$.....	\$.....
Base Bottom.....	2.00	3.50	4.00	6.75
Base Panels, each.....	.....	1.00	1.25	1.50
Base Casting.....	3.50	.....	.....	.....
Base Top Ring.....	.....	2.75	4.00	4.50
Base Front Frame.....	.....	.75	1.25	1.75
Base Door.....	.60	.75	1.00	1.50
Base Door Slide Damper.....	.40	.40	.....	.....
Base Butterfly Door.....	.....	.....	.40	.40
Circular Slide Grate.....	1.25	1.25	*1.75	*3.50
Grate Center Slide.....	.40	.60	*.60	*1.00
Front Grate Bar.....	.....	.....	1.00	1.50
Shaker Grate Bar.....	.....	.....	1.75	2.25
Back Grate Bar.....	.....	.....	1.00	1.50
Grate Connecting Bar.....	.....	.....	.40	.60
Shaker Handle.....	.40	.40	.60	.60
Firepot.....	17.00	33.00	49.00	64.00
Inside Firepot Ring.....	1.50	.....	.....	.....
Outside Firepot Ring.....	1.75	.....	.....	.....
Fire Door Frame.....	.75	1.25	1.25	1.25
Fire Door.....	.40	.75	.75	.75
Clinker Door.....	.....	.40	.40	.40
Clinker Door Frame.....	.....	.60	.60	.60
Drop Tube.....	.....	2.00	3.50	6.50
Drop Tube Nipple.....	.....	3" 1.00	4" 1.25	4" 1.25
Intermediate Section.....	.....	.....	.....	12.50
Cleanout Door.....	.....	.....	.....	.40
Section Ring.....	.....	.75	1.00	1.25
Water Dome.....	.....	12.00	13.50	18.50
Steam Dome.....	.....	.....	25.50	36.00
Nipple (screw).....	.....	4" 1.25	5" 1.50	5" 1.50
Smoke Hood complete.....	1.50	2.50	3.00	4.00

\*Used on Old Style Boilers.

## For Arco Tank Heaters

Name of Part	10-in.	12-in.	15-in.
Base.....	\$*3.50	\$ 4.00	\$ 6.50
Base Bottom.....	1.75	2.25	3.25
Front Grate Bar.....	.75	1.25	1.25
Center Grate Bar.....	.....	.....	2.00
Back Grate Bar.....	1.00	1.50	1.25
Connecting Bar.....	.40	.40	.40
Base Door.....	.60	.75	.75
Butterfly Door.....	.40	.40	.40
Shaker Handle.....	.40	.40	.40
Base complete.....	8.50	10.25	14.50
Firepot.....	11.00	13.50	19.00
Clinker Door Frame.....	.60	.60	.60
Clinker Door.....	.40	.40	.40
Flue Ring.....	.60	.75	.75
Reducing Ring.....	.60	.60	.60
Sub-Top.....	2.25	2.50	3.75
Top.....	1.75	2.25	3.50
Cover.....	.40	.40	.60

# Sectional Boiler Parts

15-, 18-, 21-, 24-, 30-, and 36-inch.

Name of Part	15-in.	18-in.	21-in.	24-in.	30-in.	Old 36-in.
Front Section, S.....	25 00	40 00	52 00	61 00	87 00	131 00
“ “ W.....	22 00	37 00	46 00	57 00	77 00	116 00
“ Flue Conn., S.....	30 00	.....	65 00	.....	85 00	.....
“ “ W.....	25 00	.....	54 00	.....	76 00	.....
Center Conn., S.....	30 00	37 00	64 00	60 00	86 00	123 00
“ “ W.....	26 00	35 00	63 00	54 00	75 00	107 00
Center Section, S.....	30 00	36 00	61 00	59 00	85 00	115 00
“ “ W.....	25 00	34 00	54 00	52 00	75 00	101 00
Rear Conn. Section, S.....	30 00	37 00	62 00	60 00	86 00	120 00
“ “ W.....	25 00	34 00	54 00	54 00	79 00	105 00
Back Conn. “ S.....	30 00	44 00	58 00	72 00	97 00	150 00
“ “ W.....	25 00	42 00	52 00	63 00	85 00	138 00
Nipples, Top, S.....	3" 60 6"	70 3"	60 6"	70 6"	70 6"	70
“ “ W.....	2½" 60 3"	60 3"	60 4"	60 3"	60 6"	70
“ Bottom, S. and W.....	2½" 60 2½"	60 3"	60 3"	60 3"	60 4"	60
Base Front Frame.....	2 50	3 00	4 00	4 25	6 25	10 75
“ Door.....	1 25	1 50	1 50	1 75	2 00	2 50
“ Butterfly Door.....	50	50	60	1 00	1 00	1 00
“ Back Panel.....	2 25	3 25	4 00	4 00	5 50	9 00
“ “ Strip.....	1 50	60	75	75	75	2 25
Angle Lever.....	60	60	60	60	60	60
“ “ Conn. Arm, L.H.....	.....	60	60	60	60	60
“ “ R.H.....	.....	.....	.....	.....	.....	.....
Short.....	.....	.....	.....	1 00	.....	.....
Angle Lever Conn. Arm, R. H., Medium.....	.....	.....	1 00	1 25	1 25	1 75
Angle Lever Conn. Arm, R. H., Long.....	.....	.....	1 25	1 50	1 50	2 00
Shaker Handle.....	75	75	75	1 00	1 00	1 25
2- and 3-Lug Conn. Bar.....	1 25	75	75	75	75	1 00
4-Lug Conn. Bar.....	1 50	1 00	1 00	1 00	1 25	1 75
5- “ “ “.....	1 75	1 25	.....	.....	.....	.....
6- “ “ “.....	2 00	1 50	.....	.....	.....	.....
7- “ “ “.....	2 25	1 75	.....	.....	.....	.....
Grate Bar, R. or L.....	3 00	2 75	4 50	4 50	7 50	12 00
1-Section Base Side.....	1 50	1 50	2 00	2 25	2 25	3 00
2- “ “ “.....	.....	3 00	3 25	3 50	3 50	5 25
4- “ “ “.....	5 00	5 00	5 75	.....	.....	.....
5- “ “ “.....	5 75	6 00	7 00	9 00	9 00	11 50
6- “ “ “.....	7 00	7 50	8 00	10 75	10 75	14 00
7- “ “ “.....	7 75	9 00	10 50	12 50	12 50	17 00
8- “ “ “.....	9 00	.....	.....	13 75	13 75	18 50
9- “ “ “.....	.....	.....	.....	15 00	.....	20 00
Clinker Door and Lining....	1 00	50	1 25	1 25	* 1 00	2 00
Fire Door and Lining.....	2 25	3 00	4 25	4 25	4 00	5 00
R.-H. Upp'r C. O. Door and Lining.....	1 50	1 25	2 25	2 25	3 25	6 75
L.-H. Upp'r C. O. Door and Lining.....	1 50	1 25	2 25	2 25	3 25	6 50
R.-H. Lower C. O. Door and Lining.....	.....	1 00	2 25	2 25	4 00	6 50
L.-H. Lower C. O. Door and Lining.....	.....	1 00	2 00	2 25	4 00	2 00
Center C. O. Door and Lin'g.....	.....	50	.....	.....	.....	.....
Smoke-Hood Damper.....	50	50	50	75	1 00	1 50
Smoke-Hood, Complete....	5 50	4 25	9 25	8 00	14 00	8 50

Cotter pins, each, net..... 05.

\* This size has two clinker doors.

# Sectional Boiler Parts

22, 28, New, 36 and 48 inch

Name of Part	22-inch	28-inch	New 36"	48-inch
Fire Door .....	\$2.00	\$2.75	\$3.75	*\$3.00
" " Lining .....	1.50	2.00	3.00	*2.50
Upper C. O. Door, R. or L. ....	1.25	1.75	3.25	6.75
" " " Lining, R. or L. ....	.75	1.50	2.50	5.00
Lower " " " R. or L. ....				3.25
" " " Lining, R. or L. ....				3.00
1-Section Base Panel .....	1.75	2.00	2.25	5.00
2- " " " " .....	2.75	3.00	4.00	8.75
5- " " " " .....	5.50	6.50	9.25	.....
6- " " " " .....	7.25	8.75	11.75	23.50
7- " " " " .....	8.25	9.75	14.00	26.50
8- " " " " .....	9.25	10.75	15.00	32.00
Base Front Panel .....	5.50	7.75	9.00	16.75
" Back " Lower Half .....	3.25	4.00	5.25	8.50
" " " Upper " .....	3.00	4.25	7.25	6.00
" Front Door .....	1.75	2.25	3.00	3.50
Clinker Door, R. or L. ....	.60	1.00	1.00	1.25
" " " Lining, R. or L. ....	.40	.60	.60	1.00
Base Butterfly Door .....	.60	.75	1.25	2.25
R. H. Front Half Con. Arm, Short ..			1.50	2.25
" " " " " Medium .....	1.00	1.50	1.75	2.50
" " " " " Long .....	1.25	1.75	2.00	3.00
2-Link L. H. Connecting Arm .....	1.00	1.25	1.75	.....
2- " R. H. " " Short .....	1.25	1.50	1.75	1.75
2- " R. H. " " Long .....	1.50	2.25	.....	.....
3- " L. H. " " .....	1.50	1.75	2.25	2.25
3- " R. H. " " .....	1.25	1.75	2.25	2.25
4- " L. H. " " .....	1.50	2.25	3.00	3.00
4- " R. H. " " .....			2.75	2.75
5- " L. H. " " .....			3.25	3.25
Grate Bar, R. or L. ....	5.50	10.00	16.50	25.00
Front Coal Guard .....	1.50	1.75	3.00	4.25
Angle Lever .....	.60	1.00	1.00	1.00
Shaker Handle .....	.75	1.00	2.00	2.00
Smoke Hood .....	3.00	11.00	12.50	26.25
" " Damper .....	.60	.75	1.25	2.75
" " Cover .....	1.00	1.75	2.50	4.25
" " Check Draft .....	.60	.75	.75	1.50
" " Door Weight .....	.40	.40	.40	.75
" " Lever and Clamp .....	.60	.60	.60	.60
" " Complete .....	5.50	14.25	17.00	35.00
Push Nipple, Top .....	4" .60	4" .60	6" .70	6" .70
" " Bottom .....	3" .60	3" .60	4" .60	4" .60
" " Center Front Section .....				3" .60
Front Section, Steam .....	40.00	63.00	92.00	*83.00
" " Water .....	39.00	59.00	89.00	*78.00
Front Flue Connecting, Steam .....				*90.00
" " " Water .....				*87.00
Open Center, Steam .....	45.00	68.00	93.00	*90.00
" " Water .....	43.00	64.00	88.00	*83.00
Closed Center, Steam .....	46.00	69.00	96.00	*91.00
" " Water .....	45.00	66.00	88.00	*82.00
Open Connecting, Steam .....	47.00	69.00	93.00	*92.00
" " Water .....	44.00	66.00	88.00	*87.00
Closed Connecting, Steam .....	48.00	72.00	99.00	*93.00
" " Water .....	45.00	67.00	92.00	*86.00
Rear Center Connecting, Steam .....	47.00	72.00	98.00	*91.00
" " " Water .....	45.00	68.00	95.00	*85.00
Back Section Steam .....	47.00	74.00	100.00	*92.00
" " Water .....	44.00	68.00	98.00	*86.00

\*48-inch Boilers have right and left castings Above is price of either one.



# Sectional Boiler Parts

List Price of Parts to Increase Boiler One Size

Steam		Water	
No.	Price	No.	Price
15-inch .....	\$ 40.00	15-inch .....	\$ 39.00
18 " .....	45.00	18 " .....	42.50
21 " .....	70.00	21 " .....	65.50
22 " .....	62.50	22 " .....	61.00
24 " .....	72.50	24 " .....	70.00
28 " .....	102.00	28 " .....	100.00
30 " .....	115.00	30 " .....	105.00
36 " N. S. ....	130 00	36 " N. S. ....	130.00
36 " O. S. ....	150.00	36 " O. S. ....	135.00
48 " .....	180.00	48 " .....	170.00

## Arrangement of Sections

A—Front Section; B—Back Section; C—Closed Front Flue Connecting;  
D—Open Front Flue Connecting; E—Open Center; F—Closed Center;  
G—Open Connecting; H—Closed Connecting; J—Rear Connecting; K—  
Half Open Center; L—Half Open Connecting; M—Closed 4 Flue Center;  
O—Closed 5 Flue Center; P—Rear Center.

S-15-4-A-D-J-B  
S-15-5-A-C-E-J-B  
S-15-6-A-C-K-E-J-B  
S-15-7-A-C-F-K-E-J-B  
S-15-8-A-C-F-F-L-E-J-B

W-15-4-A-C-G-B  
W-15-5-A-C-K-G-B  
W-15-6-A-C-F-K-G-B  
W-15-7-A-C-F-F-K-G-B  
W-15-8-A-C-F-F-H-K-G-B

085-A-H-F-G-B  
086-A-H-F-F-G-B  
087-A-H-F-F-F-G-B

185-A-H-F-G-B  
186-A-F-H-F-G-B  
187-A-F-H-F-F-G-B

S-21-5-A-C-K-G-B  
S-21-6-A-C-F-K-G-B  
S-21-7-A-C-F-F-K-G-B

W-21-5-A-C-K-G-B  
W-21-6-A-C-F-K-G-B  
W-21-7-A-C-F-F-K-G-B

S-22-5-A-C-E-J-B  
S-22-6-A-H-E-E-J-B  
S-22-7-A-H-F-G-E-J-B  
S-22-8-A-H-F-F-G-E-J-B

W-22-5-A-G-E-J-B  
W-22-6-A-H-E-E-J-B  
W-22-7-A-H-F-G-E-J-B  
W-22-8-A-H-F-F-G-E-J-B

045-A-H-F-G-B  
046-A-H-F-F-G-B  
047-A-H-F-F-F-G-B  
048-A-H-F-F-H-F-G-B

245-A-H-F-G-B  
246-A-F-H-F-G-B  
247-A-F-H-F-F-G-B  
248-A-F-H-F-H-F-G-B  
S-28-5-A-G-E-J-B  
S-28-6-A-H-E-E-J-B  
S-28-7-A-H-F-G-E-J-B  
S-28-8-A-H-F-F-G-E-J-B

W-28-5-A-G-E-J-B  
W-28-6-A-H-E-E-J-B  
W-28-7-A-H-F-G-E-J-B  
W-28-8-A-H-F-F-G-E-J-B

S-30-5-A-C-K-G-B  
S-30-6-A-C-F-K-G-B  
S-30-7-A-C-F-F-K-G-B  
S-30-8-A-C-F-F-H-K-G-B

P. S. For list price of sections see pages 203 and 204. Sections not listed on those pages will be billed as follows: C and D as Front Flue Connecting, E, F and K as Center Sections, and G, H and L as Center Connecting Sections.

# Sectional Boiler Parts

## Arrangement of Sections—Continued

W-30-5-A-C-K-G-B  
W-30-6-A-C-F-K-G-B  
W-30-7-A-C-F-F-K-G-B  
W-30-8-A-C-F-F-H-K-G-B

065-A-H-M-G-B  
066-A-H-M-O-G-B  
067-A-H-M-O-M-G-B  
068-A-H-M-O-H-M-G-B  
069-A-H-M-O-H-M-O-G-B

365-A-H-M-G-B  
366-A-H-M-O-G-B  
367-A-H-M-O-M-G-B  
368-A-H-M-O-H-M-G-B  
369-A-H-M-O-H-M-O-G-B

S-36-5-A-G-E-J-B  
S-36-6-A-H-E-E-J-B  
S-36-7-A-H-F-G-E-J-B

S-36-8-A-H-F-F-G-E-J-B  
S-36-9-A-H-F-H-E-G-E-J-B

W-36-5-A-G-E-J-B  
W-36-6-A-H-E-E-J-B  
W-36-7-A-H-F-G-E-J-B  
W-36-8-A-H-F-F-G-E-J-B  
W-36-9-A-H-F-H-E-G-E-J-B

S-48-6\*-A-C-E-G-P-B  
S-48-7\*-A-C-F-E-G-P-B  
S-48-8\*-A-C-F-H-E-G-P-B  
S-48-9\*-A-C-F-F-H-E-G-P-B  
S-48-10\*-A-C-F-F-H-E-E-G-P-B

W-48-6\*-A-C-E-E-J-B  
W-48-7\*-A-C-F-E-E-J-B  
W-48-8\*-A-C-F-F-G-E-J-B  
W-48-9\*-A-C-F-F-G-E-E-J-B  
W-48-10\*-A-C-F-F-F-G-E-E-J-B

P. S. For List Price of Sections, see pages 203 and 204. Sections not listed are priced as follows: C and D as Front Flue Connecting, M and O as Center Sections, and G and H as Center Connecting Sections when not listed.

\* 48-inch Boilers have double Sections.

## Arrangement of Grate Bars and Connecting Arms

BOILER NO.	Left-Hand Grate Bars	Right-Hand Grate Bars	Size Right-Hand Connecting Arm	BOILER NO.	Left-Hand Grate Bars	Right-Hand Grate Bars	Size Right-Hand Connecting Arm
S- or W-15-4	3	....	.....	S- or W-28-6	3	2	Medium
S- or W-15-5	4	....	.....	S- or W-28-7	3	3	"
S- or W-15-6	5	....	.....	S- or W-28-8	4	3	Long
S- or W-15-7	6	....	.....				
S- or W-15-8	7	....	.....	S- or W-30-5	4	....	.....
				S- or W-30-6	3	2	Medium
085-185....	4	....	.....	S- or W-30-7	3	3	"
086-186....	5	....	.....	S- or W-30-8	4	3	Long
087-187....	6	....	.....				
				065-365....	4	..	.....
S- or W-21-5	4	....	.....	066-366....	3	2	Medium
S- or W-21-6	3	2	Medium	067-367....	3	3	"
S- or W-21-7	3	3	"	068-368....	4	3	Long
				069-369....	4	4	"
S- or W-22-5	2	2	.....	S- or W-36-5	2	2	Short
S- or W-22-6	3	2	.....	S- or W-36-6	3	2	Medium
S- or W-22-7	3	3	Medium	S- or W-36-7	3	3	"
S- or W-22-8	4	3	Long	S- or W-36-8	4	3	Long
				S- or W-36-9	4	4	"
045-245....	2	2	Short				
046-246....	3	2	Medium	S- or W-48-6	3	2	Short
047-247....	3	3	"	S- or W-48-7	3	3	"
048-248....	4	3	Long	S- or W-48-8	4	3	Medium
				S- or W-48-9	4	4	"
S- or W-28-5	2	2	.....	S- or W-48-10	5	4	Long



# Round Boiler Parts

For 1908 Premier Steam and Water Boilers

Name of Part	15-in.	18-in.	21-in.	24-in.
New Premier Base Casting.....	\$11.00	\$14.50	\$17.50	\$19.50
Base Front Frame.....	2.25	2.25	2.50	2.50
Base Door.....	1.25	1.25	1.50	1.50
Base Butterfly Door.....	.50	.50	.50	.50
Front Grate Bar.....	1.00	1.50	1.75	2.25
Center Grate Bar.....	1.50	1.75	3.00	3.25
Back Grate Bar.....	1.00	1.50	1.75	2.25
Connecting Bar.....	.50	.75	.75	1.00
Connecting Arm.....	.50	.50	.50	.50
Angle Lever.....	.60	.60	.60	.60
Shaker Handle.....	.75	.75	.75	.75
Base Complete.....	20.00	25.00	30.00	35.00
Firepot.....	35.00	48.00	60.00	72.00
Fire Door Frame.....	1.50	1.50	1.75	1.75
Fire Door and Lining.....	1.50	1.75	2.00	2.25
Clinker Door Frame.....	.75	.75	.75	.75
Clinker Door and Lining.....	.60	.60	.75	.75
Cleanout Door Frame.....	.75	.75	1.00	1.25
Cleanout Door and Lining.....	.75	.75	.75	.75
Cleanout Panel.....	.75	.75	1.00	1.00
Three-Flue Section.....	8.50	11.00	15.00	18.00
Two-Flue Section.....	8.25	10.00	14.00	17.00
Steam Dome.....	23.00	28.00	33.00	41.00
Water Dome.....	13.00	15.00	19.00	23.00
Smoke Hood Top Half.....	1.00	1.00	1.50	1.50
Smoke Hood Bottom Half.....	1.50	1.50	1.50	1.50
Smoke Hood Damper.....	.50	.50	.75	.75
Smoke Hood Check Draft Door.....	.40	.40	.50	.50
Smoke Hood Complete.....	3.00	3.00	4.00	4.00
Push Nipple.....	4" .60	5" .60	6" .70	6" .70

For Junior Steam and Water Boilers

Name of Part	15-inch	18-inch
Base Casting.....	\$13.25	\$14.25
Base Top Ring.....	2.25	2.75
Base Front Frame.....	2.00	2.00
Base Door.....	1.00	1.00
Base Butterfly Door.....	.50	.50
Front Grate Bar.....	1.50	1.75
Center Grate Bar.....	1.75	2.50
Back Grate Bar.....	1.50	1.75
Connecting Bar.....	.60	.60
Connecting Arm.....	.60	.60
Angle Lever.....	.60	.60
Shaker Handle.....	.75	1.25
Firepot.....	49.00	64.00
Clinker Door Frame.....	.60	.60
Clinker Door and Lining.....	.40	.40
Fire Door Frame.....	1.75	1.75
Fire Door and Lining.....	1.00	1.00
Section Ring Complete.....	2.25	2.25
Intermediate Section.....	6.50	12.50
Steam Dome.....	21.00	28.00
Water Dome.....	12.50	18.00
Smoke Hood Complete.....	2.50	3.50
Screw Nipple.....	5" 1.50	5" 1.50

# Water Heater Parts

## For Premier Junior Tank Heaters

Name of Part	10-inch	12-inch	15-inch	18-inch
Base Casting .....	\$3.50	\$9.50	\$13.25	\$14.25
" Front Frame .....		1.75	2.00	2.00
" Door .....	.60	1.00	1.00	1.00
" Butterfly Door .....		.40	.50	.50
" Top Ring .....			2.25	2.75
Grate for Center Slide .....	1.25			
Grate Center Slide .....	.40			
Front Grate Bar .....		1.00	1.50	1.75
Center " " .....			1.75	2.50
Back " " .....		1.00	1.50	1.75
Connecting " .....		.40	.60	.60
Connecting Arm .....		.40	.60	.60
Angle Lever .....		.60	.60	.60
Shaker Handle .....	.40	.75	1.00	1.00
Fire Pot .....	21.00	35.00	49.00	72.00
" Door Frame .....	.75	1.50	1.50	1.50
" " .....	.60	.75	.75	.75
" Pot Ring .....	1.00	1.25	1.25	2.00
Clinker Door Frame .....	.60	.60	.60	.60
" " and Lining .....	.40	.40	.60	.60
Section Ring, Complete .....		1.25	2.00	2.25
Deflector Damper, Complete .....			.75	.75
Water Dome .....		10.50	12.50	18.00
Smoke Hood, Complete .....	1.00	1.75	3.25	3.25
Screw Nipple .....		4" 1.25	5" 1.50	5" 1.50

## For Laundry and Tank Heaters

	1-C	1-A	2	3
Base Casting .....	\$3.50	\$.....	\$.....	\$.....
Base Bottom .....		2.50	3.50	4.00
" Panels, each .....		.75	1.00	1.25
" Top Ring .....		2.00	2.75	4.00
" Front Frame .....		.75	.75	1.25
" Door .....	.60	.60	.75	1.25
" Butterfly Door .....		.40	.40	.40
Circular Slide Grate .....	1.25			
Grate Center Slide .....	.40			
Front Grate Bar .....		.75	1.00	1.00
Shaker Grate Bar .....		1.00	1.50	1.50
Back " " .....				1.00
Connecting Bar .....		.40	.40	.40
Shaker Handle .....	.40	.40	.40	.40
Fire Pot .....	9.75	6.25	11.50	13.50
Combustion Rings, each .....	1.50			
Flat Iron Rest .....		3.25	3.75	4.00
Fire Door .....		.40	.40	.40
Laundry Sub-Top .....	4.00	2.50	3.00	3.25
" Top .....	3.00	2.50	3.00	3.25
Flue Strip .....	1.00	.75	1.00	1.00
Top Covers, each .....	.40	.40	.40	.40
Top Center .....	.40	.40	.40	.40

# Steam Boiler Trimmings

Used on all Boilers except 48-inch Sectional

Water Column.....	\$2.00	¾" Pop Safety Valve.....	\$2.75
¾" Try Cocks, each.....	1.00	1" " ".....	3.00
Two ½" Gauge Cocks, each.....	1.25	1½" " ".....	3.75
Glass.....	.40	1½" " ".....	5.00
Guards, per set.....	.40	2" " ".....	6.75
Diaphragm Trap.....	1.50	2½" " ".....	11.75
" Bracket.....	.40	3" " ".....	16.00
" Plunger.....	.40	9' Jack Chain.....	.40
" Lever.....	.50	12' " ".....	.50
" Weights, each.....	.60	18' " ".....	.75
" Rubbers (7").....	.50	¼" Pet Cock.....	.60
Pipe and Fittings.....	2.00	⅛" " ".....	.60

**4½-INCH STEAM GAUGE: IDEAL SYLPHON REGULATOR:** See Specialty List and Discount.

**TRY COCKS:** All Round and Sectional Boilers have two Try Cocks. Prior to adopting Water Columns cast on front section, 30" and 36" Sectional Boilers had three Try Cocks.

**DIAPHRAGM WEIGHTS:** On 24-, 28-, 30-, and 36-inch Sectional Boilers the Cast-Iron Diaphragm Damper Regulator is supplied with two weights; all other Boilers have only one weight.

**POP SAFETY VALVES:** Our Steam Boilers are regularly supplied, viz.: ¾-inch Valve on 15-inch Premier.

1-inch Valve on 18-, 19-, 21-, and 22-inch Round Boilers, 15- and 18-inch Sectional and No. 2 and No. 3 Series Coke Boilers.

1¼-inch Valve on 24- to 28-inch Round Boilers, 21- to 30-inch Sectional and No. 4 Series Coke Boilers.

1½-inch Valve on 30- to 36-inch Round Boilers, 36-inch Sectional and No. 5 Series Coke Boilers. 2-inch Valve on 48-inch Sectional Boilers.

**JACK CHAIN:** Our Steam Boilers are supplied with the following lengths of Jack Chain:

- 9 feet on 15- and 18-inch Premier and all Coke Boilers.
- 12 feet on Portable, Invincible, and Arco Boilers
- 18 feet on 21- to 32-inch Premier and all Sectional Boilers.

**PET COCKS:** Sectional Steam Boilers are supplied with one ⅛-inch Pet Cock and all Round Steam Boilers are supplied with one ¼-inch and one ⅛-inch Pet Cock. The ⅛-inch Pet Cocks form part of the lower Gauge Cock and the ¼-inch Pet Cocks on Round Boilers go on bottom of Water Column.

## For 48-inch Sectional Boilers Only

Water Column.....	\$3.75
Three ½-inch Try Cocks, each.....	1.25
Two ¾-inch Gauge Cocks, each.....	3.50
Glass.....	.40
Guards, per set.....	.40
Pipe and Fittings.....	2.50
2-inch Pop Safety Valve.....	6.75
18-foot Jack Chain.....	.75
One ⅛-inch Cock.....	.60
One 6-inch Steam Gauge.....	9.00

# Boiler Sundries, Fire Tools, Etc.

## Flue Brushes

4½" x 4" x 1¾"	Used on all Round except Premier Boilers and on Sectional Boilers to 36 inches	...\$1.00
6" x 4½" x 2¾"	Used on New 36- and 48-inch Sectional Boilers	..... 3.00
2¾" x 4" x 1"	Oval Brushes used on Premier Boilers	.. 1.00
Round Brushes 2", 2½", 3", or 4" diameter for Fire-Box Boilers		..... 1.00

## Brush Handle

Round Boilers	.....	\$ .75
All Sectional except 48-inch	.....	1.00
48-inch Sectional	.....	1.50

## Poker

Round Boilers, 15- to 28-inch Grate	.....	\$ .75
Round Boilers, 30- to 36-inch Grate	.....	1.25
Sectional, to 36-inch	.....	1.25
36 to 48-inch Sectional	.....	2.00

## Scraper

Round Boilers	.....	\$ .75
48-inch Sectional Boilers	.....	1.25

## Slice Bar

Sectional, to 30-inch inclusive	.....	\$1.25
36-inch Sectional	.....	1.75
48-inch Sectional	.....	2.75

## Hoe and Handle

Sectional, to 28-inch	.....	\$ .75
30- to 48-inch Sectional	.....	1.75

## Boiler Putty

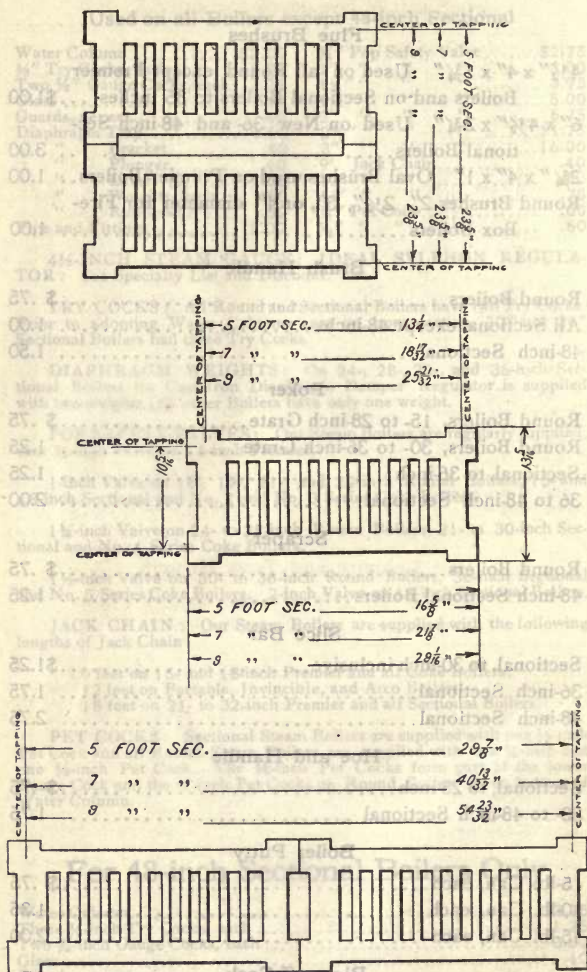
5-lb. Can, each	.....	\$ .75
10-lb. Can, each	.....	1.35
15-lb. Can, each	.....	2.00

## Blow-off Cock

¾-inch Angle Blow-off Cock, each	.....	\$1.50
1-inch Angle Blow-off Cock, each	.....	2.25



# Wall-Radiator Measurements



American Wall-Radiators are tapped 1 1/2 inches supply and return, and unless otherwise ordered, will be bushed according to regular tapping list on page 112. See also "Directions for Ordering," page 116.



# Wall Radiators—Continued

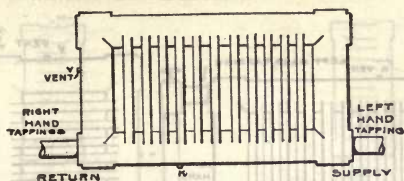


Fig. 3. Horizontal One and Two-pipe Steam

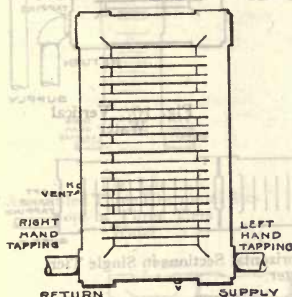


Fig. 4. Vertical One and Two-pipe Steam

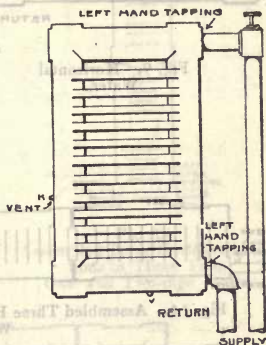


Fig. 6. Vertical One and Two-pipe Steam

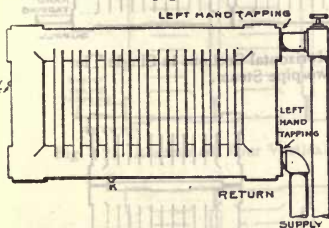


Fig. 5. Horizontal One and Two-pipe Steam

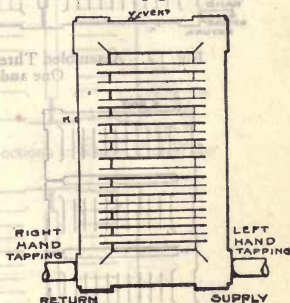


Fig. 8. Vertical Water.

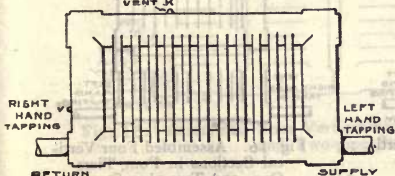


Fig. 7. Horizontal Water

# Wall Radiators—Continued

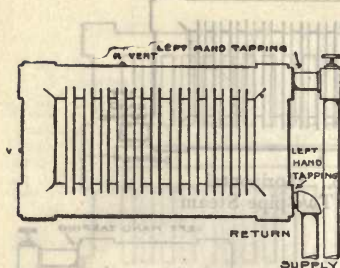


Fig. 9. Horizontal Water

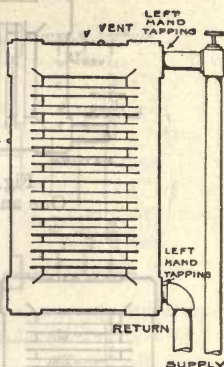


Fig. 10. Vertical Water

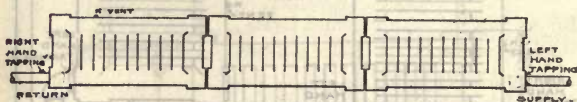


Fig. 11. Assembled Three Horizontal Sections in Single Tier Water

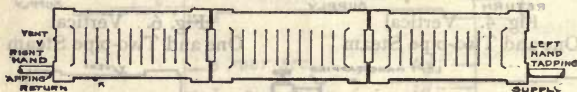


Fig. 12. Assembled Three Horizontal Sections in Single Tier One and Two-pipe Steam.

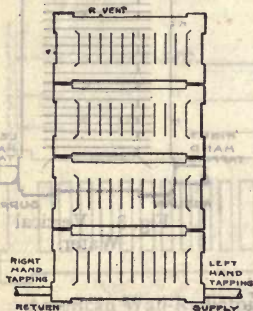


Fig. 15. Assembled Four Vertical Sections in Four Tiers Water

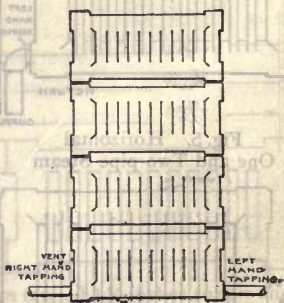


Fig. 16. Assembled Four Vertical Sections in Four Tiers One- and Two-pipe Steam

# Wall Radiators—Continued

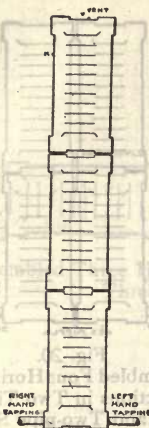


Fig. 13.  
Assembled Three Horizontal Sections in Three Tiers Water

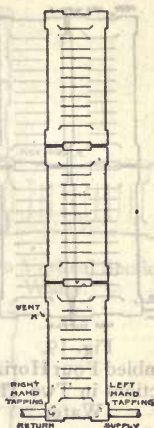


Fig. 14.  
Assembled Three Horizontal Sections in Three Tiers One and Two-pipe Steam

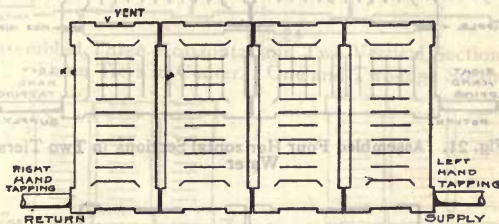


Fig. 17. Assembled Four Vertical Sections in Single Tier Water

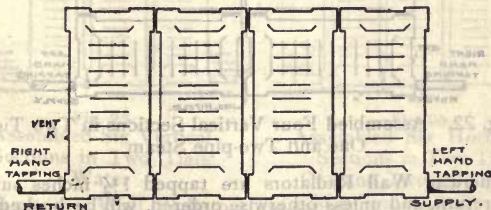


Fig. 18. Assembled Four Vertical Sections in Single Tier One and Two-pipe Steam

## Wall Radiators—Continued

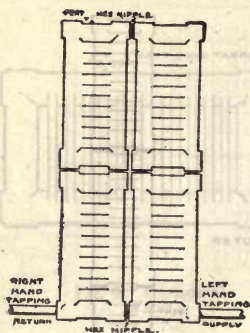


Fig. 19.  
Assembled Four Horizontal  
Sections in Two Tiers  
Water

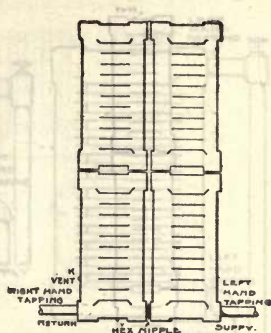


Fig. 20.  
Assembled Four Horizontal  
Sections in Two Tiers  
One and Two-pipe Steam

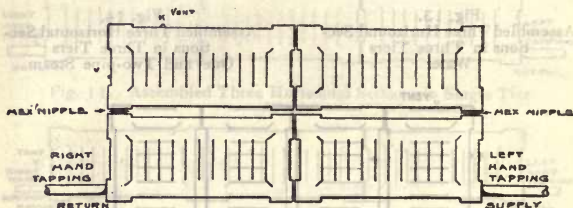


Fig. 21. Assembled Four Horizontal Sections in Two Tiers  
Water

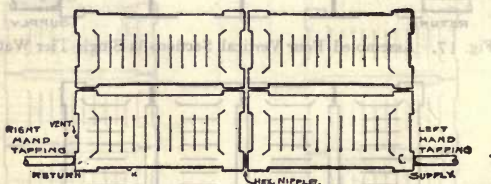


Fig. 22. Assembled Four Vertical Sections in Two Tiers  
One and Two-pipe Steam

American Wall Radiators are tapped  $1\frac{1}{2}$  inches supply and return, and unless otherwise ordered, will be bushed according to regular tapping list on page 112. See also "Directions for Ordering," page 116. Tappings other than those illustrated will be charged extra—10 cents each, net.

## Wall Radiators—Continued

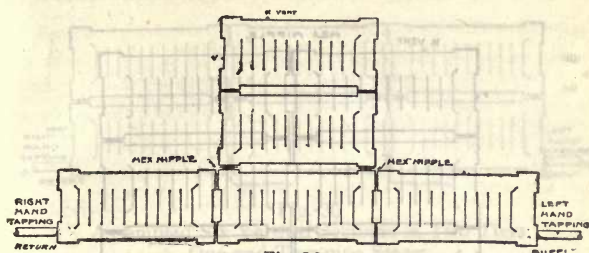


Fig. 23

Assembled Three Horizontal and Two Vertical Sections with Three Tiers in Center. Water.

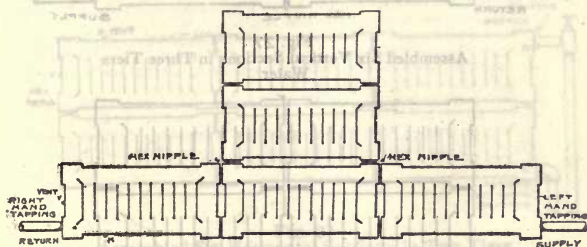


Fig. 24

Assembled Three Horizontal and Two Vertical Sections with Three Tiers in Center. One and Two-pipe Steam

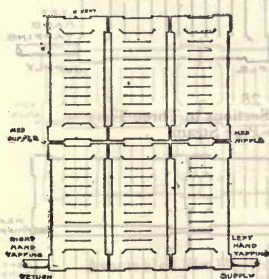


Fig. 25

Assembled Six Vertical Sections in Two Tiers Water

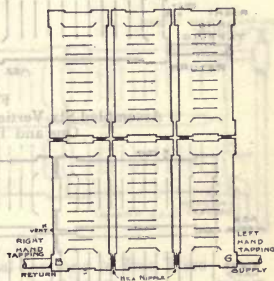


Fig. 26

Assembled Six Horizontal Sections in Two Tiers One and Two-pipe Steam

American Wall Radiators are tapped  $1\frac{1}{2}$  inches supply and return, and unless otherwise ordered, will be bushed according to regular tapping list on page 112. See also "Directions for Ordering," page 116.



## Wall Radiators—Continued

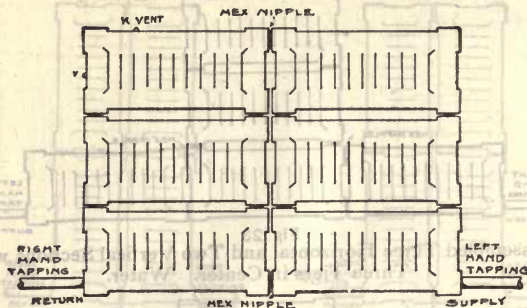


Fig. 27  
Assembled Six Vertical Sections in Three Tiers  
Water

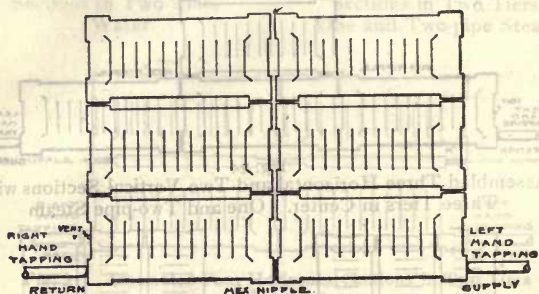


Fig. 28  
Assembled Six Vertical Sections in Three Tiers  
One and Two-Pipe Steam

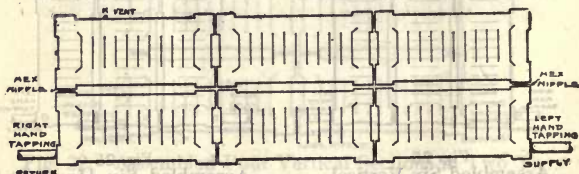


Fig. 29  
Assembled Six Horizontal Sections in Two Tiers  
Water

American Wall Radiators are tapped  $1\frac{1}{2}$  inches supply and return, and unless otherwise ordered, will be bushed according to regular tapping list on page 112. See also "Directions for Ordering," page 116.

## Wall Radiators—Continued

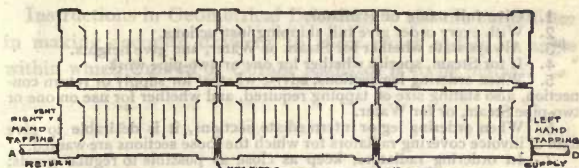


Fig. 30  
Assembled Six Vertical Sections in Two Tiers  
One and Two-pipe Steam

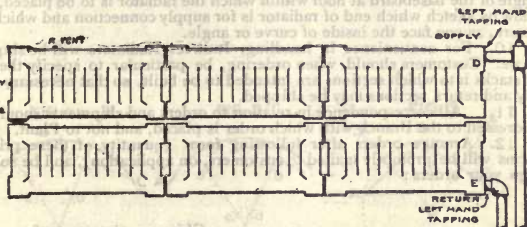


Fig. 31  
Assembled Six Horizontal Sections in Two Tiers  
Water

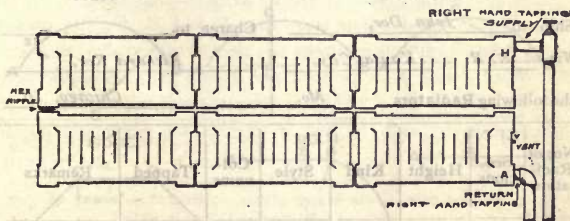


Fig. 32  
Assembled Six Horizontal Sections in Two Tiers  
One and Two-pipe Steam

American Wall Radiators are tapped  $1\frac{1}{2}$ -inch supply and return, and unless otherwise ordered, will be bushed according to regular tapping list on page 112. See also "Directions for Ordering," page 116. Tappings other than those illustrated will be charged extra—10 cents each, net.

# Directions for Ordering Radiators

1. Give full name of Radiator.
2. With every order give full shipping instructions.
3. Always state whether for Steam or Water, and give heights.
4. If for Steam, specify whether for one or two-pipe work.
5. When ordering leg sections, advise whether for supply or return connection, also stating size of tapping required, and whether for use on one or two-pipe Steam, or for Water.
6. When ordering leg or intermediate sections, it is desirable to give date of invoice covering radiators for which the loose sections are wanted.
7. In ordering radiators, keep as close as possible to regular goods; special tapplings and shapes frequently cause delay.
8. For convenience in handling, customers should, as far as possible, avoid ordering Direct Radiators in larger than a 32-section stack. Radiators of 1000 lbs. weight or over are liable to be strained or broken in transportation, and it is recommended that customers order these large radiators to be shipped in halves.
9. In ordering Curved or Corner Radiators, specify exact radius or angle of the baseboard at floor within which the radiator is to be placed, and show by sketch which end of radiator is for supply connection and which for return, as you face the inside of curve or angle.
10. For convenience in handling, Indirect Radiators will be shipped loose. Customers should, when ordering, be particular to specify the size of stacks into which sections are intended to be built, so that necessary supply and return sections may be shipped.
11. All correspondence in relation to orders and shipments should be addressed to the Branch with which order is placed, and not to Plant.
12. Arrange orders after following form (quantity of these printed forms will be promptly mailed to customers, on application), and be sure to sign your orders:

Dated Chicago, Oct. 1, 1908.

When Wanted At once.

AMERICAN RADIATOR CO.,  
CHICAGO, ILL.

Our Order No. 1000

Ship to John Doe,

Charge to \_\_\_\_\_

Via R. R. Kansas City,

Richard Roe,

the following Radiators. Mo.

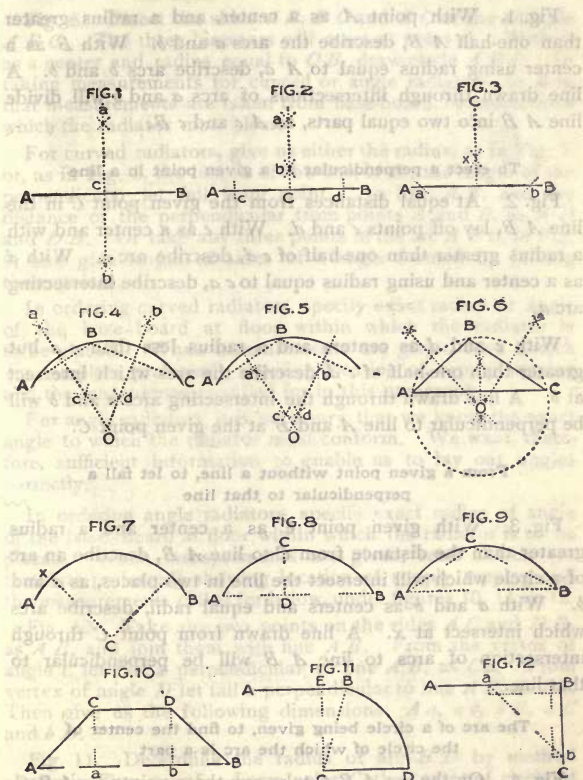
Chicago, Ill.

No. of Radiators	Sections	Height	Kind	Style	Columns	Tapped	Remarks
3	8	38	Steam	Rococo	3	2-pipe regular	

(Sign here)

# Instructions in Geometrical Drawing

Instructions in Geometrical Drawing, to aid the steamfitter in making accurate drawing to show exact radius or angle within which Curved or Corner Radiator is to be placed.



For explanation of above drawings, see pages 221 and 222.

For list of Curved and Corner or Angle Radiators made at our Plants see pages 102 to 105.



# Instructions in Geometrical Drawing

## Continued

### To bisect a line

Fig. 1. With point  $A$  as a center, and a radius greater than one-half  $AB$ , describe the arcs  $a$  and  $b$ . With  $B$  as a center using radius equal to  $Aa$ , describe arcs  $b$  and  $b$ . A line drawn through intersections of arcs  $a$  and  $b$  will divide line  $AB$  into two equal parts, as  $Ac$  and  $cB$ .

### To erect a perpendicular at a given point in a line

Fig. 2. At equal distances from the given point  $C$  in the line  $AB$ , lay off points  $c$  and  $d$ . With  $c$  as a center and with a radius greater than one-half of  $cd$ , describe arc  $a$ . With  $d$  as a center and using radius equal to  $ca$ , describe intersecting arc  $a$ .

With  $c$  and  $d$  as centers and a radius less than  $ca$  but greater than one-half of  $cd$ , describe the arcs which intersect at  $b$ . A line drawn through the intersecting arcs  $a$  and  $b$  will be perpendicular to line  $A$  and  $B$  at the given point  $C$ .

### From a given point without a line, to let fall a perpendicular to that line

Fig. 3. With given point  $C$  as a center and a radius greater than the distance from  $C$  to line  $AB$ , describe an arc of a circle which will intersect the line in two places, as  $a$  and  $b$ . With  $a$  and  $b$  as centers and equal radii, describe arcs which intersect at  $x$ . A line drawn from point  $C$  through intersection of arcs to line  $AB$  will be perpendicular to that line.

### The arc of a circle being given, to find the center of the circle of which the arc is a part

Fig. 4. On the arc  $ABC$  take any three points as  $ABC$ . Join points  $A$ ,  $B$  and  $C$  by lines  $AB$  and  $BC$ . Bisect lines  $AB$  and  $BC$  by method shown in Fig. 1. The bisecting lines  $oa$  and  $ob$  will intersect at point  $o$ , which will be the center of the circle of which the arc  $ABC$  is a part.

Fig. 5. Same as Fig. 4, excepting that in bisecting lines  $AB$  and  $BC$  the intersecting arcs are all within the circle.



# Instructions in Geometrical Drawing

## Continued

### To circumscribe a circle about a given triangle

Fig. 6. Bisect the sides  $AB$ ,  $BC$  and  $AC$  of the triangle  $ABC$ . The three bisectors will meet at point  $O$ . With  $O$  as a center and radius equal to  $OB$ , draw circle  $ABC$ . In taking measurements for curved or angle radiators, be sure that measurements are taken from base-board, or projections which the radiator must clear.

For curved radiators, give us either the radius, as in Fig. 7, or, as in Fig. 8, the length of the line,  $AB$ ; the length of the perpendicular let fall from point  $C$  to line  $AB$ , and the distance of the perpendicular from points  $A$  and  $B$ , as  $AD$  and  $DB$ . Or take any three points in the arc  $ABC$ , in Fig. 9, and give length of sides of triangle formed by joining these points.

In ordering curved radiators, specify exact radius or angle of the base-board at floor within which the radiator is to be placed. When measurements are given, send sketch (or template preferred) showing location of supply tapping and the measurements called for in this paragraph.

For angle radiators, it is necessary that we know the exact angle to which the radiator must conform. We want, therefore, sufficient information to enable us to lay out angles correctly.

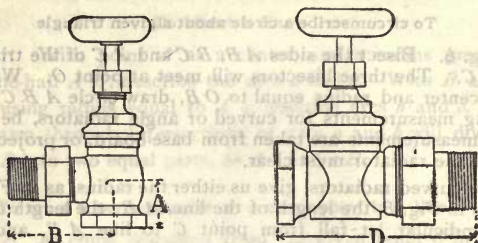
In ordering angle radiators, specify exact radius of angle of the base-board at floor within which the radiator is to be placed. When measurements are given, send sketch (or template preferred) showing location of supply tapping and the measurements called for below, under figures 10, 11 or 12.

Fig. 10. Take any two points on the sides  $AC$  and  $DB$ , as  $Aa$ , and join them with line  $AB$ . From the vertex of angle  $C$  let fall a perpendicular to line  $AB$ , as  $Ca$ . From vertex of angle  $D$  let fall a perpendicular to line  $AB$ , as  $Db$ . Then give us the following dimensions;  $Aa$ ,  $ab$ ,  $bB$ ,  $aC$  and  $bD$ .

Fig. 11. Determine the radius of arc  $BD$  by method shown in Figs. 4 or 5. From point  $C$ , the center of circle of which arc  $BD$  is a part, erect a perpendicular to line  $AB$ , as  $CE$ . Give length of radius  $CB$  and perpendicular  $CE$ .

Fig. 12. With the vertex of the angle  $B$  as a center, lay off equal distances  $Ba$  and  $Bb$ . Join points  $a$  and  $b$ , and give lengths of sides  $aB$ ,  $Bb$  and  $ab$  of the triangle thus formed.

# Measurements of Valves and Elbows



Size, inches .....		$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Nos. 70 to 74 Valves.....	A	$1\frac{1}{4}$	$1\frac{7}{8}$	$1\frac{9}{8}$	$1\frac{13}{8}$	2	$2\frac{9}{8}$
	B	$2\frac{1}{2}$	$2\frac{11}{8}$	$3\frac{1}{4}$	$3\frac{1}{2}$	$3\frac{3}{8}$	$4\frac{3}{8}$
Nos. 99 to 103 " .....	A	....	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{13}{8}$	$2\frac{7}{8}$	$2\frac{11}{8}$
	B	....	$2\frac{3}{4}$	3	$3\frac{1}{2}$	$3\frac{3}{8}$	$4\frac{1}{2}$
Nos. 160 to 164 " .....	A	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{5}{8}$	$1\frac{7}{8}$	$2\frac{1}{8}$	$2\frac{1}{2}$
Nos. 150 to 154 " .....	B	$2\frac{1}{2}$	$2\frac{11}{8}$	$3\frac{1}{4}$	$3\frac{1}{2}$	$3\frac{3}{8}$	$4\frac{1}{2}$
Nos. 140 to 144 " .....	A	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{5}{8}$	$1\frac{7}{8}$	$2\frac{7}{8}$	$2\frac{3}{2}$
	B	$2\frac{1}{2}$	$2\frac{11}{8}$	$3\frac{1}{4}$	$3\frac{1}{2}$	$3\frac{3}{8}$	$4\frac{1}{2}$
Nos. 114 to 118 " .....	D	....	$4\frac{1}{4}$	$4\frac{3}{4}$	$5\frac{9}{8}$	$6\frac{1}{8}$	$7\frac{1}{4}$
No. 301 .....	A	$1\frac{1}{4}$	$1\frac{7}{8}$	$1\frac{5}{8}$	$1\frac{7}{8}$	$2\frac{1}{8}$	$2\frac{1}{2}$
	B	$2\frac{1}{2}$	$2\frac{11}{8}$	$3\frac{1}{4}$	$3\frac{1}{2}$	$3\frac{3}{8}$	$4\frac{1}{2}$
Nos. 130 to 134 Union Elbows....	A	$2\frac{3}{8}$	$2\frac{9}{8}$	$3\frac{1}{8}$	$3\frac{3}{8}$	$3\frac{1}{2}$	$4\frac{3}{8}$
	B	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{11}{8}$	$1\frac{11}{8}$	$2\frac{5}{8}$	$2\frac{5}{8}$
No. 335 Gate Valve .....	D	....	$2\frac{1}{2}$	$2\frac{7}{8}$	$3\frac{1}{4}$	$3\frac{1}{2}$	$4\frac{1}{8}$
No. 373 " .....	D	....	4	$4\frac{1}{2}$	5	$5\frac{1}{2}$	$6\frac{3}{8}$

## Expansion of Wrought-Iron Pipe

Temperature of the Air when Pipe is Fitted	Length of Pipe when Fitted	Length of Pipe when Heated to							
		215°		265°		297°		338°	
		Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.
Zero	100 feet	100	1.72	100	2.12	100	2.31	100	2.70
32°	100 "	100	1.47	100	1.78	100	2.12	100	2.45
64°	100 "	100	1.21	100	1.61	100	1.87	100	2.19

# Outlets for Sectional Steam Boilers

In connection herewith we show three outline sketches illustrating the difference in velocity at which the steam passes from the dome of the Boiler to the main through one, two and three outlets at a pressure of 2 pounds.

Note, that as the number and area of the steam outlets increase, the velocity of the steam decreases, which insures a steady water line, preventing priming or carrying water into the mains.

For example, the use of one 4-in. steam outlet (Fig. 1) causes a velocity of 45 feet per second, based on a radiating condensing surface of 2,500 square feet.

The use of two 4-in. outlets (Fig. 2) reduces the velocity one-half or  $22\frac{1}{2}$  feet per second for each outlet.

The use of three 4-in. outlets (Fig. 3) reduces the velocity one-third or 15 feet per second for each outlet.

It is therefore important that *all steam outlets provided*, based upon the boiler's capacity, be used by being connected their *full area* to the steam main.

The steam main may be of any size that good practice calls for.

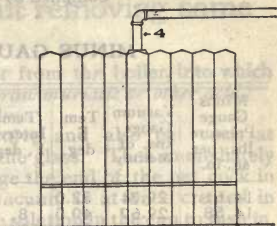


Fig. 1.

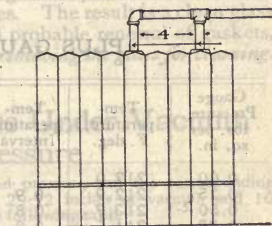


Fig. 2.

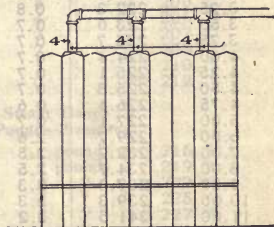


Fig. 3.

# Pressures and Temperatures at Sea Level

Compiled by C. B. Thompson

## MINUS GAUGE PRESSURE

Minus Gauge Pressure lbs. per sq. in.	Vacuum Gauge, ins. of Mercury	Tem. F. deg.	Tem. Interval F. deg.	Minus Gauge Pressure lbs. per sq. in.	Vacuum Gauge, ins. of Mercury	Tem. F. deg.	Tem. Interval F. deg.
14.61	29.74	32.0	.....	10.70	21.78	153.1	11.5
14.58	29.67	40.0	8.	9.70	19.74	162.3	9.2
14.52	29.56	50.0	10.	8.70	17.70	170.1	7.8
14.44	29.40	60.0	10.	7.70	15.67	176.9	6.8
14.34	29.19	70.0	10.	6.70	13.63	182.9	6.0
14.20	28.90	80.0	10.	5.70	11.60	188.3	5.4
14.00	28.51	90.0	10.	4.70	9.56	193.2	4.9
13.76	28.00	100.0	10.	3.70	7.52	197.8	4.6
13.70	27.88	102.1	2.1	2.70	5.49	202.0	4.2
12.70	25.85	126.3	24.2	1.70	3.45	205.9	3.9
11.70	23.83	141.6	15.3	0.70	1.41	209.6	3.7

## PLUS GAUGE PRESSURE

Gauge Pressure, lbs. per sq. in.	Tem- perature, F. deg.	Tem- perature Interval	Gauge Pressure, lbs. per sq. in.	Tem- perature, F. deg.	Tem- perature Interval
0.00	212.0	.....	12.0	243.7	2.2
0.25	212.9	0.9	13.0	245.7	2.0
0.50	213.7	0.8	14.0	247.7	2.0
0.75	214.5	0.8	15.0	249.6	1.9
1.00	215.3	0.8	16.0	251.5	1.9
1.25	216.1	0.8	17.0	253.3	1.8
1.50	216.9	0.8	18.0	255.1	1.8
1.75	217.7	0.8	19.0	256.9	1.8
2.00	218.5	0.8	20.0	258.6	1.7
2.25	219.3	0.8	21.0	260.2	1.6
2.50	220.0	0.7	22.0	261.9	1.7
2.75	220.8	0.8	23.0	263.5	1.6
3.00	221.5	0.7	24.0	265.1	1.6
3.25	222.3	0.8	25.0	266.6	1.5
3.50	223.0	0.7	30.0	273.9	7.3
3.75	223.7	0.7	40.0	286.5	12.6
4.00	224.4	0.7	50.0	297.5	11.0
4.25	225.1	0.7	60.0	307.1	9.6
4.50	225.8	0.7	70.0	315.8	8.7
4.75	226.4	0.6	80.0	323.7	7.9
5.00	227.1	0.7	90.0	330.9	7.2
6.00	229.7	2.6	100.0	337.6	6.7
7.00	232.2	2.5	110.0	343.9	6.3
8.00	234.7	2.5	120.0	349.8	5.9
9.00	237.0	2.3	130.0	355.0	5.2
10.00	239.3	2.3	140.0	360.0	5.0
11.00	241.5	2.2	150.0	365.7	5.7



## How to Clean a Water Gauge Glass on a Steam Boiler without removing same

1. Draw a cupful of hot water from the boiler, into which pour at least a tablespoonful of *raw muriatic or other acid*;

2. Close both water gauge valves;

3. Open top water gauge valve and also pet cock at bottom, and blow water out of the glass. Then immediately close the top valve and submerge the end of the pet cock in cup of hot water solution. A vacuum is at once created in the gauge glass which causes the solution in the cup to rush in.

4. Keep the pet cock immersed and operate the top valve, slightly opening and closing, alternately expelling and drawing in the solution until all grease, oil or other matter adhering to the inside of the glass is cut out. Then close pet cock and *open both water gauge valves*.

It is necessary to have *one pound pressure of steam or more* on the boiler before commencing this operation, which need not occupy more than ten minutes. The result is a clean glass without the risk of breakage and probable renewal of gaskets, which is *frequently the case when removing the glass for cleaning*.

## Steam Temperatures Under Vacuum and Pressure

The various degrees of vacuum and pressure and the corresponding boiling temperature of water between 29.92 inches of vacuum and 10 pounds steam pressure are shown in the following table:

Vacuum Gauge inches of Vacuum	Temperature of Steam or Boil- ing Point of Water	Vacuum Gauge inches of Vacuum	Temperature of Steam or Boil- ing Point of Water
29.92 ins.	98 deg.	8 ins.	196 deg.
29 "	100 "	7 "	199 "
28 "	102 "	6 "	201 "
27 "	114 "	5 "	203 "
26 "	125 "	4 "	205 "
25 "	133 "	3 "	207 "
24 "	140 "	2 "	208 "
23 "	146 "	1 "	210 "
22 "	152 "	0 "	212 "
21 "	157 "		
20 "	161 "		
19 "	165 "	Steam Gauge Pounds Pressure	
18 "	169 "	1 pound	215 "
17 "	172 "	2 pounds	219 "
16 "	175 "	3 "	222 "
15 "	178 "	4 "	225 "
14 "	181 "	5 "	227 "
13 "	184 "	6 "	230 "
12 "	186 "	7 "	232 "
11 "	188 "	8 "	235 "
10 "	191 "	9 "	237 "
9 "	194 "	10 "	240 "



# Cleaning Steam Boilers

## When Water Supply Pressure is Available

Remove the Safety Valve from the Boiler and connect a Blow-off Pipe to the opening, extending the pipe to the outside of the building or to some suitable drain. The size of this pipe should be as follows:

Boilers rated from	600 sq. ft. to 1200 sq. ft.	$\frac{3}{4}$ -in. pipe.
" " "	1200 " " " 2500 " " "	1 -in. "
" " "	2500 " " " 4500 " " "	$1\frac{1}{4}$ -in. "
" " "	larger than 4500 sq. ft.	$1\frac{1}{2}$ -in. pipe.

A  $\frac{3}{4}$ -inch garden hose is of sufficient capacity for a Boiler of about 800 square feet.

Close off all the Radiator Valves connected with the system, or if the main flow and return pipes are equipped with Gate Valves, these valves may be closed in place of closing the Radiator Valves. Fill the Boiler, including steam dome, with water. Through one of the openings five or ten pounds of sal soda may be dumped into the Boiler. This solution is boiled for fifteen or twenty minutes. The cold water pressure is then turned into the Boiler, which drives the dirty water out through the safety-valve tapping and pipe above referred to. The city pressure is kept on until the water runs clear and so appears in the gauge-glass. Then close off the Water Feed Valve and evaporate the water down to the proper water line in the Boiler.

Remove the Blow-off Pipe and replace the Safety Valve. Open up the Radiator Valves or the Gate Valves on the flow and return pipes, as the case may be, and then the heating outfit is ready for operation with the Boiler thoroughly cleaned inside.

# Cleaning Steam Boilers

## With, or Without Water-Supply Pressure

Unavoidable accumulations of oil, grease or grit in a new system causes a boiler to foam, prevents generation of steam, and produces an unsteady water line; therefore it is necessary to *blow off boiler under pressure.*

1. Close off the main steam and return valves, *or all Radiator valves.*

2. Make a wood fire and get up a pressure of at least ten pounds as indicated by the steam gauge.

3. Open the blow-off valves, being careful that just sufficient fire is carried to maintain a pressure until the last gallon of water is exhausted.

4. Allow fire to die out.

5. Open all fire and flue doors and in about half an hour

6. Close blow-off valve and

7. Refill boiler slowly to water line.

8. Open all radiator and main valves and

9. Start fire.

A boiler should be blown off within a week after it is installed and in operation. If one blowing off does not result in a clean water gauge glass, proper generation of steam and a steady water line, the boiler should be blown off a second, and if necessary a third and fourth time.

# Table to Determine the Water-Heating or Tank Capacities of any Ideal Heating Boiler

When the specifications for tank heating are greater than the regular Water-Heater capacity will cover, a house-heating boiler may be used by employing the following rule: Multiply the specified quantity of water in U. S. gallons to be heated by the factor in body of table, which coincides with the desired rise in temperature per hour and the time boiler must run on one fuel charge, and the result will be the catalogue rating of proper size Ideal Boiler to be used.

Boiler will run on one charge of fuel hours.....		6	7	8	9	10	11	12
Temperature rise Fahrenheit degrees per hour	20.....	.71	.82	.94	1.06	1.17	1.29	1.41
	30.....	1.06	1.23	1.41	1.49	1.76	1.93	2.11
	40.....	1.41	1.65	1.88	2.12	2.35	2.59	2.82
	50.....	1.76	2.05	2.35	2.65	2.94	3.23	3.53
	60.....	2.12	2.47	2.82	3.17	3.52	3.88	4.23
	70.....	2.47	2.88	3.29	3.70	4.11	4.52	4.94
	80.....	2.82	3.29	3.76	4.23	4.70	5.17	5.64
	90.....	3.17	3.70	4.23	4.76	5.30	5.82	6.35
	100.....	3.52	4.11	4.70	5.30	5.88	6.46	7.06
	110.....	3.87	4.52	5.17	5.82	6.46	7.10	7.75
	120.....	4.24	4.95	5.65	6.36	7.06	7.78	8.48
	130.....	4.57	5.34	6.10	6.86	7.62	8.40	9.15
	140.....	4.93	5.76	6.58	7.40	8.22	9.05	9.88
	150.....	5.29	6.17	7.05	7.93	8.82	9.70	10.06
	160.....	5.64	6.58	7.52	8.46	9.40	10.35	11.30
	170.....	6.00	7.00	8.00	9.00	10.00	11.00	12.00

The use of the above table is possible only when the boiler ratings are based on the exact boiler power, and the exact power can be determined only by accurate tests of each and every boiler. *IDEAL Boilers are the only boilers in the world* that are so rated, and therefore the power expressed in radiation may be used for the purpose of computing the water-heating power under any given set of conditions, or *vice versa*. The following examples will make the foregoing statement clear:

# Table to Determine the Water-Heating or Tank Capacities of Any Ideal Heating Boiler—Continued

*Example 1.*—80 degrees F. must be added per hour to 500 gallons of water contained in a 500-gallon storage tank. The heater must run eight hours on one charge of fuel. Look in the table (page 228) opposite 80 degrees and under eight hours, and find the factor 3.76. Multiply 500 gallons by 3.76 and the product is 1,880 square feet of water-boiler capacity. Turn to Graded Ratings on pages 4 and 5 and find that the nearest capacity is 1,950 square feet, which is No. 31-4 W Standard.

If the boiler for above installation must run twelve hours on one fuel charge, a boiler 50% larger must be selected. Opposite 80 degrees and under 12 hours is the factor 5.64, and  $500 \times 5.64$  is 2,820 square feet capacity.

*Example 2.*—It is required to add 120 degrees to 1,200 gallons of water every four hours, the boiler to run eight hours without attention, on one fuel charge. What capacity of boiler in square feet of radiation should be selected? Turn to the table and find opposite 120 degrees temperature rise, and under 8 hours the factor 5.65. Multiply 1,200 gallons by 5.65, which gives a capacity of 6,780 square feet, which is the boiler capacity if the work must be done in *one hour*; but as there are four hours in which to do the work, we divide 6,780 by 4, and find the required capacity is 1,695 square feet.

Now turn to the Graded Ratings on pages 4 and 5, where will be found five different boilers of about 1,700 feet capacity. If on this job the boiler must run on one fuel charge for twelve hours without attention, a boiler of 50% more capacity must be selected. Under the hour 12 is the factor 8.48; the procedure is  $\frac{1,200 \times 8.48}{4} = 2,544$  square feet capacity.

*Example 3.*—What size boiler must be used to heat 1,500 gallons of water from 60 to 160 degrees F. in four hours, the boiler to run nine hours on one fuel charge of hard coal? The factor opposite 100 and under 9 is 5.30. Then  $1,500 \times 5.30$  gives a boiler capacity of 7,950 square feet if the work is done in *one hour*; but since there are four hours, divide 7,950 by 4, which gives the approximate capacity of 1,990 square feet.

If soft coal is used, see paragraph on soft coal, page 242.



# Special Water Temperature Ratings

Actual practice has demonstrated that a Water Heater which will impart from 25 to 30 degrees per hour to the water in the storage tank is sufficiently large for the ordinary residence; and for apartment buildings, in which the demand is proportionately heavier, a Heater that will impart from 40 to 45 degrees per hour. These capacities are indicated in the tables by heavy-faced figures.

It is, however, for the Plumber or Heating Contractor, who alone is familiar with all the conditions and requirements, to select from the tables the capacity of Heater needed for each specific installation. The tables are equally applicable to the heating of water for special requirements, as swimming-pools, bottle washing vats and other purposes. The figures in line 1 represent so many hours' firing from one charge of hard coal which is the basis, because its available heating power is constant.

## No. 10 Ideal Arco Water Heater

Heater's total potential energy, 136,000 British thermal units

1—Hours.....	5	6	7	8	9	10	11	12
2—Hard coal* per hr. lbs.	4.00	3.33	2.86	2.50	2.22	2.00	1.82	1.66
3—Power per hr., B. t. u.	27200	22666	19428	17000	15111	13600	12363	11333
4—Radiation, sq. ft. ....	153	128	110	96	85	76	69	64

### Capacity in U. S. Gallons per hour

Temperature rise Fahrenheit degrees per hour	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
130	108	93	81	72	65	59	54	49	45	42	38	34	30	27	24	21
108	90	77	66	58	51	46	41	37	34	30	27	24	21	19	17	16
92	77	66	58	51	46	41	37	34	30	27	24	21	19	17	16	15
82	68	59	51	46	41	37	34	30	27	24	21	19	17	16	15	14
72	60	51	45	40	36	32	29	26	23	21	19	17	16	15	14	13
65	53	46	40	36	32	29	26	23	21	19	17	16	15	14	13	12
58	48	41	36	32	29	26	23	21	19	17	16	15	14	13	12	11
54	45	39	34	30	27	24	21	19	17	16	15	14	13	12	11	10
50	42	36	31	28	25	22	20	18	16	15	14	13	12	11	10	9
46	38	33	29	26	23	21	19	17	16	15	14	13	12	11	10	9
44	37	31	28	24	22	20	18	16	15	14	13	12	11	10	9	8
40	33	29	25	22	20	18	16	15	14	13	12	11	10	9	8	7
38	32	27	24	21	19	17	16	15	14	13	12	11	10	9	8	7
36	30	26	22	20	18	16	15	14	13	12	11	10	9	8	7	6
34	28	24	21	19	17	16	15	14	13	12	11	10	9	8	7	6
32	27	23	20	18	16	14	13	12	11	10	9	8	7	6	5	5

## No. 0 Ideal Junior Water Heater

Heater's total potential energy, 154,000 British thermal units

1—Hours.....	5	6	7	8	9	10	11	12
2—Hard coal* per hr. lbs.	4.40	3.66	3.14	2.75	2.45	2.20	2.00	1.83
3—Power per hr., B. t. u.	30800	25666	22000	19250	17111	15400	14000	12833
4—Radiation, sq. ft. ....	174	145	124	109	96	87	79	72

### Capacity in U. S. Gallons per hour

Temperature rise Fahrenheit degrees per hour	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
148	124	106	93	82	74	67	62	56	51	47	43	39	36	33	30	27
123	103	88	77	68	62	56	51	46	42	38	34	31	28	25	22	20
106	88	75	66	58	51	46	41	37	34	31	28	25	22	20	18	16
92	77	66	58	51	46	41	37	34	31	28	25	22	20	18	16	15
83	69	59	52	46	41	37	34	31	28	25	22	20	18	16	15	14
74	62	53	46	41	37	34	31	28	25	22	20	18	16	15	14	13
67	56	48	42	37	34	31	28	25	22	20	18	16	15	14	13	12
62	51	44	39	34	31	28	25	22	20	18	16	15	14	13	12	11
57	48	41	36	32	29	26	23	21	19	17	16	15	14	13	12	11
53	44	38	33	30	27	24	21	19	17	16	15	14	13	12	11	10
49	41	35	31	27	25	22	20	18	16	15	14	13	12	11	10	9
46	39	33	29	26	23	21	19	17	16	15	14	13	12	11	10	9
43	36	31	27	24	22	20	18	16	15	14	13	12	11	10	9	8
41	34	29	25	23	21	19	17	16	15	14	13	12	11	10	9	8
39	33	28	24	22	20	18	16	15	14	13	12	11	10	9	8	7
36	30	26	23	20	18	17	15	14	13	12	11	10	9	8	7	6

\* If soft coal is to be used, see note, page 242.

## No. 1-C Ideal Laundry Water Heater

Heater's total potential energy, 168,000 British thermal units

1—Hours.....	5	6	7	8	9	10	11	12
2—Hard coal* per hr. lbs.	4.2	3.5	3.0	2.6	2.3	2.1	1.9	1.7
3—Power per hr., B. t. u.	33600	28000	24000	21000	18666	16800	15272	14000
4—Radiation, sq. ft.....	189	159	135	119	104	94	86	79

### Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25.....	161	134	115	100	89	81	73	67
	30.....	134	112	96	84	74	67	61	56
	35.....	115	96	82	72	64	58	52	48
	40.....	100	83	71	63	56	50	45	42
	45.....	89	74	64	56	49	45	40	37
	50.....	81	68	58	51	45	41	37	34
	55.....	73	61	52	46	41	37	33	30
	60.....	67	56	46	42	37	34	30	28
	65.....	62	52	44	39	34	31	28	27
	70.....	57	48	41	36	32	29	26	24
	75.....	52	43	37	33	29	26	24	23
	80.....	50	41	35	31	28	25	23	21
	85.....	47	38	33	29	26	24	21	19
	90.....	45	37	32	28	24	22	20	18
	95.....	43	36	31	27	23	21	19	17
	100.....	41	34	29	25	22	20	18	16

## No. 101 Ideal Premier Junior Water Heater

Heater's total potential energy, 240,000 British thermal units

1—Hours.....	5	6	7	8	9	10	11	12
2—Hard coal* per hr. lbs.	6.40	5.33	4.57	4.00	3.55	3.20	2.91	2.67
3—Power per hr., B. t. u.	48000	40000	34285	30000	26666	24000	21818	20000
4—Radiation, sq. ft.....	271	226	192	170	147	135	124	113

### Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25.....	231	192	165	144	128	116	105	96
	30.....	193	160	137	120	107	96	87	80
	35.....	165	137	117	103	91	82	75	69
	40.....	144	120	103	90	80	72	65	60
	45.....	128	106	91	80	70	64	58	53
	50.....	116	96	82	72	64	58	52	48
	55.....	105	87	75	65	58	52	47	44
	60.....	96	80	68	60	53	48	44	40
	65.....	89	74	63	56	49	44	40	37
	70.....	83	68	58	51	45	41	37	34
	75.....	77	64	55	48	42	38	35	32
	80.....	72	60	51	45	40	36	33	30
	85.....	67	56	48	42	37	34	31	28
	90.....	65	53	45	40	35	32	29	27
	95.....	61	50	43	38	33	30	27	25
	100.....	58	48	41	36	32	29	26	24

\* If soft coal is to be used, see note, page 242.



## No. 10 Ideal Junior Water Heater

Heater's total potential energy, 320,000 British thermal units

1—Hours.....	5	6	7	8	9	10	11	12
2—Hard coal* per hr. lbs.	8.00	6.66	5.72	5.00	4.44	4.00	3.63	3.33
3—Power per hr., B. t. u.	64000	53333	45714	40000	35555	32000	29090	26666
4—Radiation, sq. ft.....	362	302	258	226	200	181	164	150

### Capacity in U. S. gallons per hour

Temperature rise degrees per hour	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
307	257	219	192	171	154	139	128	116	106	96	87	77	70	64	58	53
256	213	183	160	142	121	109	96	87	77	70	64	58	53	49	45	43
219	182	156	137	121	107	96	85	77	70	63	58	53	49	45	43	40
192	160	137	120	107	94	85	77	70	63	58	53	49	45	43	40	37
170	142	121	106	94	85	77	70	63	58	53	49	45	43	40	37	35
154	128	110	96	85	77	70	63	58	53	49	45	43	40	37	35	33
139	116	100	87	77	70	63	58	53	49	45	43	40	37	35	33	32
128	107	91	80	71	64	58	53	49	45	43	40	37	35	33	32	
118	99	84	74	65	59	53	49	45	43	40	37	35	33	32		
109	91	78	68	61	55	50	45	43	40	37	35	33	32			
102	85	73	64	57	51	46	43	40	37	35	33	32				
96	80	69	60	53	48	44	40	37	35	33	32					
90	75	64	56	50	45	40	37	35	33	32						
85	71	61	53	47	43	39	35	33	32							
80	67	57	50	44	41	36	33	32								
77	64	55	48	43	39	35	32									

## No. 12 Ideal Arco Water Heater

Heater's total potential energy, 246,400 British thermal units

1—Hours.....	5	6	7	8	9	10	11	12
2—Hard coal* per hr. lbs.	6.40	5.33	4.57	4.00	3.55	3.20	2.91	2.67
3—Power per hr., B. t. u.	49280	41066	35200	30800	27377	24640	22400	20533
4—Radiation, sq. ft.....	275	230	197	173	155	138	125	115

### Capacity in U. S. gallons per hour

Temperature rise degrees per hour	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
236	197	169	148	131	118	107	99	89	82	76	70	62	55	49	45	41
196	163	140	123	109	98	89	82	76	70	62	55	49	45	41	38	35
169	140	120	105	93	84	76	67	62	55	49	45	41	38	35	33	31
148	123	106	93	82	74	67	62	55	49	45	41	38	35	33	31	28
132	110	94	83	73	66	60	55	49	45	41	38	35	33	31	28	27
118	97	84	74	66	59	54	49	45	41	38	35	33	31	28	26	25
108	90	77	68	60	54	49	45	41	38	35	33	31	28	26	25	
98	82	70	61	56	49	45	41	38	35	33	31	28	26	25		
90	75	64	56	50	45	41	38	35	33	31	28	26	25			
84	70	60	53	47	42	38	35	33	31	28	26	25				
78	65	56	49	43	39	35	33	31	28	26	25					
74	62	53	46	41	37	33	31	28	26	25						
68	57	48	43	38	34	31	28	26	25							
64	53	46	40	36	32	29	27									
62	52	44	39	34	31	28	26									
60	50	43	38	33	30	27										

\* If soft coal is to be used, see note, page 242.

# No. 121 Ideal Premier Junior Water Heater

Heater's total potential energy, 350,000 British thermal units

1—Hours.....	5	6	7	8	9	10	11	12
2—Hard coal* per hr. lbs.	8.6	7.16	6.14	5.38	4.78	4.3	3.91	3.58
3—Power per hr., B. t. u.	70000	58333	50000	43750	38888	35000	31818	29166
4—Radiation, sq. ft.....	395	328	282	249	220	198	181	164

## Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25.....	336	280	240	210	187	168	154	140
	30.....	280	233	200	175	155	140	128	117
	35.....	239	200	171	150	133	120	109	100
	40.....	210	175	150	132	117	105	96	88
	45.....	186	155	133	117	103	93	85	78
	50.....	168	140	120	105	93	84	77	70
	55.....	153	127	109	96	85	76	70	64
	60.....	140	117	100	88	78	70	64	58
	65.....	129	107	92	81	71	65	59	54
	70.....	120	100	86	75	67	60	55	50
	75.....	112	93	80	70	62	56	51	47
	80.....	105	87	75	66	58	52	48	44
	85.....	98	82	70	61	55	49	45	41
	90.....	93	77	67	58	51	47	43	39
	95.....	88	73	63	55	49	44	41	37
	100.....	84	70	60	53	47	42	39	35

# No. 12 Ideal Junior Water Heater

Heater's total potential energy, 352,000 British thermal units

1—Hours.....	5	6	7	8	9	10	11	12
2—Hard coal* per hr. lbs.	8.00	6.66	5.72	5.00	4.44	4.00	3.63	3.33
3—Power per hr., B. t. u.	70400	58666	50285	44000	39111	35200	32000	29333
4—Radiation, sq. ft.....	398	332	284	249	220	199	180	165

## Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25.....	336	280	240	210	187	168	154	140
	30.....	280	233	200	175	156	140	128	117
	35.....	239	200	171	150	133	120	109	100
	40.....	210	175	150	132	117	105	96	88
	45.....	186	155	133	117	103	93	85	78
	50.....	168	140	120	105	93	84	77	70
	55.....	153	127	109	96	84	76	70	63
	60.....	140	117	100	88	77	70	64	58
	65.....	129	108	93	81	72	65	59	54
	70.....	120	100	86	75	67	60	55	50
	75.....	112	93	80	70	62	56	51	47
	80.....	105	87	74	66	58	52	48	43
	85.....	98	82	70	61	54	49	45	41
	90.....	93	78	67	58	52	47	43	39
	95.....	88	73	63	55	49	44	41	37
	100.....	84	70	60	53	47	42	39	35

\* If soft coal is to be used, see note, page 242.

## No. 122 Ideal Premier Junior Water Heater

Heater's total potential energy, 385,000 British thermal units

1—Hours.....	5	6	7	8	9	10	11	12
2—Hard coal* per hr. lbs.	8.6	7.16	6.14	5.38	4.78	4.3	3.91	3.58
3—Power per hr., B. t. u.	77000	64166	55000	48125	42777	38500	35000	32083
4—Radiation, sq. ft.....	435	361	310	274	242	218	199	180

### Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
370	308	264	231	205	185	168	154	140	128	110	96	85	77	70	64	55
308	257	220	193	171	154	140	128	116	105	93	84	76	68	60	52	44
264	220	189	165	147	132	120	110	100	90	81	73	65	57	49	41	33
231	193	165	144	128	116	105	96	87	78	70	62	54	46	38	30	22
205	171	146	128	114	102	93	84	76	68	60	52	44	36	28	20	12
185	154	132	116	103	92	84	76	68	60	52	44	36	28	20	12	4
168	139	119	105	93	84	76	68	60	52	44	36	28	20	12	4	
154	128	110	96	86	77	70	64	55	47	40	33	26	19	12	5	
140	119	102	89	79	72	65	57	49	41	33	25	18	11	5		
128	110	94	83	73	66	60	52	44	36	28	20	12	5			
110	96	88	77	68	62	56	51	45	40	34	28	22	16	10	4	
96	85	77	67	60	54	49	44	38	32	26	21	15	10	7	4	
85	77	68	60	54	48	42	36	30	24	19	14	10	7	4		
77	70	62	55	48	42	36	30	24	19	14	10	7	4			
70	64	55	47	40	34	28	22	16	10	7	4					
64	55	47	40	34	28	22	16	10	7	4						
55	47	40	34	28	22	16	10	7	4							
44	36	28	20	12	5											
36	28	20	12	5												
28	20	12	5													
20	12	5														
12	5															
5																

## No. 15 Ideal Arco Water Heater

Heater's total potential energy, 403,200 British thermal units

1—Hours.....	5	6	7	8	9	10	11	12
2—Hard coal* per hr. lbs.	11.2	9.33	8.00	7.00	6.22	5.60	5.09	4.66
3—Power per hr., B. t. u.	80640	67200	57600	50400	44800	40320	36654	33600
4—Radiation, sq. ft.....	456	380	326	285	254	228	207	190

### Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
388	323	277	242	216	194	176	162	146	134	121	110	101	90	81	73	68
323	268	230	201	179	161	146	134	125	115	105	96	87	78	70	62	55
277	230	197	173	153	138	125	115	105	96	87	78	70	62	55	48	41
242	201	173	151	134	121	110	101	90	81	73	65	57	49	41	34	27
216	180	154	135	120	108	98	90	81	74	68	60	52	44	36	28	21
194	162	139	121	108	97	88	80	74	68	60	52	44	36	28	21	14
176	147	126	110	99	88	80	73	68	60	52	44	36	28	21	14	7
162	135	116	101	90	81	74	68	60	52	44	36	28	21	14	7	
150	125	107	94	83	75	68	63	58	52	46	40	34	28	22	16	
138	115	99	86	77	69	63	58	52	46	40	34	28	22	16	10	
130	108	93	81	72	65	59	54	48	42	36	30	24	19	13	7	
120	100	84	75	67	60	55	50	44	38	32	26	21	15	10	4	
114	95	81	71	63	57	52	47	41	35	29	23	18	12	7		
108	90	77	68	60	54	49	44	38	32	26	21	15	10	7		
102	85	73	64	57	51	46	41	35	29	23	18	12	7			
96	80	69	60	53	48	44	38	32	26	21	15	10	7			

\* If soft coal is to be used, see note, page 242.

## No. 151 Ideal Premier Junior Water Heater

Heater's total potential energy, 560,000 British thermal units

1—Hours .....	5	6	7	8	9	10	11	12
2—Hard coal*per hr. lbs.	14.4	12.0	10.3	9.0	8.0	7.2	6.54	6.0
3—Power per hr., B. t. u.	112000	93333	80000	70000	62222	56000	50909	46666
4—Radiation, sq. ft. ....	632	525	452	395	350	316	288	265

### Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25.....	538	448	384	336	298	269	244	224
	30.....	448	373	320	280	249	224	204	187
	35.....	384	319	274	239	213	192	174	160
	40.....	336	280	240	210	187	168	153	140
	45.....	297	247	212	186	165	148	135	124
	50.....	269	224	192	168	149	134	122	112
	55.....	244	203	174	153	135	122	111	102
	60.....	224	186	160	140	124	112	102	93
	65.....	207	172	148	129	115	104	94	86
	70.....	192	159	136	120	106	96	87	80
	75.....	179	149	128	112	99	90	81	75
	80.....	168	140	120	105	93	84	76	70
	85.....	157	131	112	98	87	78	71	65
	90.....	148	124	106	93	83	74	68	62
	95.....	140	117	100	88	78	70	64	58
	100.....	135	112	96	84	74	67	61	56

## No. 152 Ideal Premier Junior Water Heater

Heater's total potential energy, 616,000 British thermal units

1—Hours .....	5	6	7	8	9	10	11	12
2—Hard coal*per hr. lbs.	14.4	12.0	10.3	9.0	8.0	7.2	6.54	6.00
3—Power per hr., B. t. u.	123200	102666	88000	77000	68444	61600	56000	51333
4—Radiation, sq. ft. ....	695	578	497	435	385	348	317	292

### Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25.....	596	497	426	373	331	298	269	244
	30.....	498	415	356	311	277	249	224	204
	35.....	426	355	304	266	237	213	192	174
	40.....	374	312	267	234	208	187	168	153
	45.....	330	275	236	206	183	165	148	135
	50.....	298	249	213	187	166	149	134	122
	55.....	270	225	193	169	150	135	122	111
	60.....	249	208	178	156	139	124	112	102
	65.....	230	192	164	144	128	115	104	94
	70.....	213	178	152	133	118	106	96	87
	75.....	198	165	141	124	110	99	90	81
	80.....	186	155	133	116	103	93	84	76
	85.....	174	145	124	109	97	87	78	71
	90.....	166	138	119	104	92	83	74	68
	95.....	156	130	111	98	87	78	70	64
	100.....	148	123	106	93	82	74	67	61

\* If soft coal is to be used, see note, page 242.



## No. 20 Ideal Junior Water Heater

Heater's total potential energy, 640,000 British thermal units

1—Hours .....	5	6	7	8	9	10	11	12
2—Hard coal*per hr. lbs.	16.00	13.33	11.43	10.00	8.89	8.00	7.27	6.66
3—Power per hr., B. t. u.	128000	106666	91428	80000	71111	64000	58181	53333
4—Radiation, sq. ft. ....	720	600	515	450	400	360	327	300

### Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25.....	614	512	439	384	341	307	280	256
	30.....	512	426	365	320	284	256	233	213
	35.....	438	365	313	274	243	219	199	183
	40.....	384	320	274	240	213	192	175	160
	45.....	339	283	242	212	188	170	154	141
	50.....	307	256	220	192	170	154	140	128
	55.....	278	232	194	174	154	139	126	116
	60.....	256	213	183	160	142	128	116	107
	65.....	237	197	169	148	131	118	108	99
	70.....	219	183	156	136	122	110	100	92
	75.....	205	170	146	128	114	102	93	85
	80.....	192	160	137	120	107	96	88	80
	85.....	179	149	128	112	99	90	81	75
	90.....	169	142	121	106	94	85	77	71
	95.....	160	133	114	100	90	80	73	67
	100.....	153	128	110	96	85	77	70	64

## No. 22 Ideal Junior Water Heater

Heater's total potential energy, 704,000 British thermal units

1—Hours .....	5	6	7	8	9	10	11	12
2—Hard coal*per hr. lbs.	16.00	13.33	11.44	10.00	8.90	8.00	7.26	6.66
3—Power per hr., B. t. u.	140800	117333	100571	88000	78222	70400	64000	58666
4—Radiation, sq. ft. ....	792	660	567	495	440	396	360	330

### Capacity in U. S. gallons per hour

Temperature rise Fahrenheit degrees per hour	25.....	672	560	480	426	373	336	305	280
	30.....	560	467	400	356	311	280	256	233
	35.....	478	397	341	304	266	239	217	199
	40.....	420	350	300	267	233	210	191	175
	45.....	372	310	266	236	207	186	169	155
	50.....	336	280	240	213	187	168	153	140
	55.....	306	255	219	193	170	153	139	128
	60.....	280	233	200	178	156	140	127	117
	65.....	258	215	184	164	143	129	117	108
	70.....	240	200	171	152	133	120	109	100
	75.....	224	187	160	141	124	112	102	93
	80.....	210	175	150	133	117	105	95	88
	85.....	196	163	140	124	109	98	89	82
	90.....	186	155	133	119	103	93	85	78
	95.....	176	147	126	111	98	88	80	73
	100.....	168	140	120	106	93	84	76	70

\* If soft coal is to be used, see note, page 242.



## No. 181 Ideal Premier Junior Water Heater

Heater's total potential energy, 1,000,000 British thermal units

1—Hours.....	5	6	7	8	9	10	11	12
2—Hard coal* per hr. lbs.	24.8	20.7	17.7	15.5	13.8	12.4	11.2	10.3
3—Power per hr., B. t. u.	200000	166666	142857	125000	111111	100000	90909	83333
4—Radiation, sq. ft. ....	1130	944	810	707	627	565	515	470

### Capacity in U. S. Gallons per hour

Temperature rise Fahrenheit degrees per hour	25.....	960	800	685	600	533	480	440	400
	30.....	800	668	571	500	445	400	367	333
	35.....	685	571	490	428	380	342	314	285
	40.....	600	500	428	375	333	300	275	250
	45.....	533	444	381	333	296	267	245	222
	50.....	480	400	342	300	267	240	220	200
	55.....	436	363	312	272	242	218	200	181
	60.....	400	333	285	250	222	200	184	166
	65.....	369	308	264	231	205	184	169	154
	70.....	342	285	245	213	190	171	157	142
	75.....	320	267	229	200	178	160	147	133
	80.....	300	250	215	188	167	150	138	125
	85.....	282	235	202	177	157	141	129	117
	90.....	267	223	190	167	148	133	123	111
	95.....	252	210	180	158	140	126	116	105
	100.....	240	200	171	150	133	120	110	100

## No. 30 Ideal Junior Water Heater

Heater's total potential energy, 1,000,000 British thermal units

1—Hours.....	5	6	7	8	9	10	11	12
2—Hard coal* per hr. lbs.	25.0	20.8	17.8	15.6	13.9	12.5	11.4	10.4
3—Power per hr., B. t. u.	200000	166666	142857	125000	111000	100000	90909	83333
4—Radiation, sq. ft. ....	1130	944	810	707	627	565	515	470

### Capacity in U. S. Gallons per hour

Temperature rise Fahrenheit degrees per hour	25.....	960	800	685	600	533	480	440	400
	30.....	800	668	571	500	445	400	367	333
	35.....	685	571	490	428	380	342	314	285
	40.....	600	500	428	375	333	300	275	250
	45.....	533	444	381	333	296	267	245	222
	50.....	480	400	342	300	267	240	220	200
	55.....	436	363	312	272	242	218	200	181
	60.....	400	333	285	250	222	200	184	166
	65.....	369	308	264	231	205	184	169	154
	70.....	342	285	245	213	190	171	157	142
	75.....	320	267	229	200	178	160	147	133
	80.....	300	250	215	188	167	150	138	125
	85.....	282	235	202	177	157	141	129	117
	90.....	267	223	190	167	148	133	123	111
	95.....	252	210	180	158	140	126	116	105
	100.....	240	200	171	150	133	120	110	100

\* If soft coal is to be used, see note, page 242.

## No. 182 Ideal Premier Junior Water Heater

Heater's total potential energy, 1,100,000 British thermal units

1—Hours.....	5	6	7	8	9	10	11	12
2—Hard coal* per hr. lbs.	24.8	20.7	17.7	15.5	13.8	12.4	11.2	10.3
3—Power per hr., B. t. u.	220000	183333	157142	137500	122222	110000	100000	91666
4—Radiation, sq. ft. ....	1243	1038	891	778	690	622	567	517

### Capacity in U. S. Gallons per hour

Temperature rise Fahrenheit degrees per hour	25.....	1056	880	754	660	587	528	480	440
	30.....	880	733	628	550	489	440	400	367
	35.....	752	627	537	470	418	376	342	314
	40.....	660	550	471	412	367	330	300	275
	45.....	587	490	419	367	326	294	267	245
	50.....	528	440	377	330	294	264	240	220
	55.....	479	400	343	300	266	240	218	200
	60.....	440	367	314	275	245	220	200	184
	65.....	405	337	289	253	225	202	184	169
	70.....	376	314	269	235	209	188	171	157
	75.....	352	293	251	220	196	176	160	147
	80.....	330	275	236	206	184	165	150	138
	85.....	310	259	222	194	172	155	141	129
	90.....	294	245	209	183	163	147	133	123
	95.....	277	231	198	173	154	139	126	116
	100.....	264	220	189	165	147	132	120	110

## No. 32 Ideal Junior Water Heater

Heater's total potential energy, 1,100,000 British thermal units

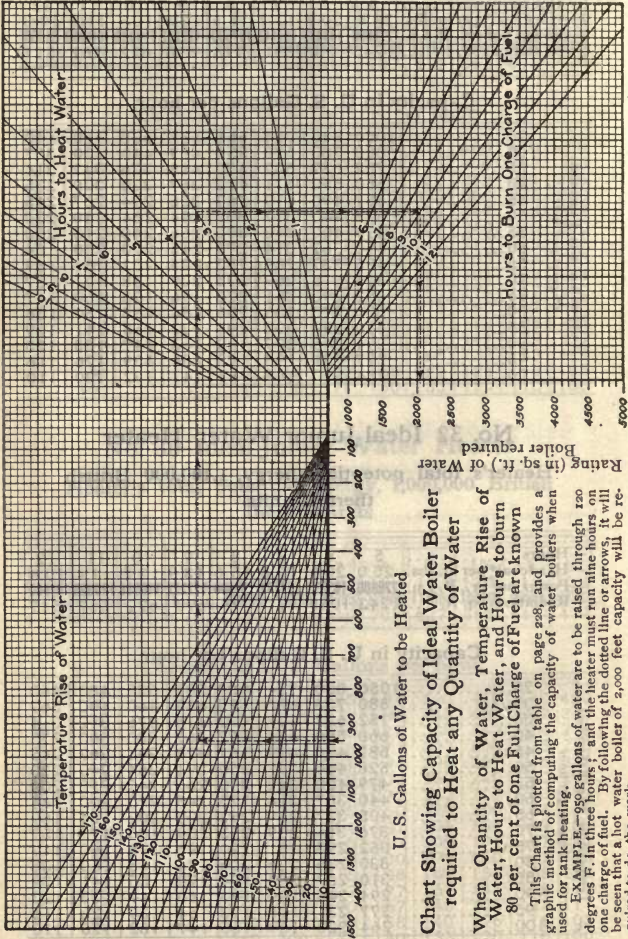
1—Hours.....	5	6	7	8	9	10	11	12
2—Hard coal* per hr. lbs.	25.0	20.8	17.8	15.6	13.9	12.5	11.4	10.4
3—Power per hr., B. t. u.	220000	183333	157142	137500	122222	110000	100000	91666
4—Radiation, sq. ft. ....	1243	1038	891	778	690	622	567	517

### Capacity in U. S. Gallons per hour

Temperature rise Fahrenheit degrees per hour	25.....	1056	880	754	660	587	528	480	440
	30.....	880	733	628	550	489	440	400	367
	35.....	752	627	537	470	418	376	342	314
	40.....	660	550	471	412	367	330	300	275
	45.....	587	490	419	367	326	294	267	245
	50.....	528	440	377	330	294	264	240	220
	55.....	479	400	343	300	266	240	218	200
	60.....	440	367	314	275	245	220	200	184
	65.....	405	337	289	253	225	202	184	169
	70.....	376	314	269	235	209	188	171	157
	75.....	352	293	251	220	196	176	160	147
	80.....	330	275	236	206	184	165	150	138
	85.....	310	259	222	194	172	155	141	129
	90.....	294	245	209	183	163	147	133	123
	95.....	277	231	198	173	154	139	126	116
	100.....	264	220	189	165	147	132	120	110

\* If soft coal is to be used, see note, page 242.

# Chart Showing Capacity of Ideal Water Boiler required to Heat any Quantity of Water





# Chart to Find Boiler Power required to Heat Swimming Pools

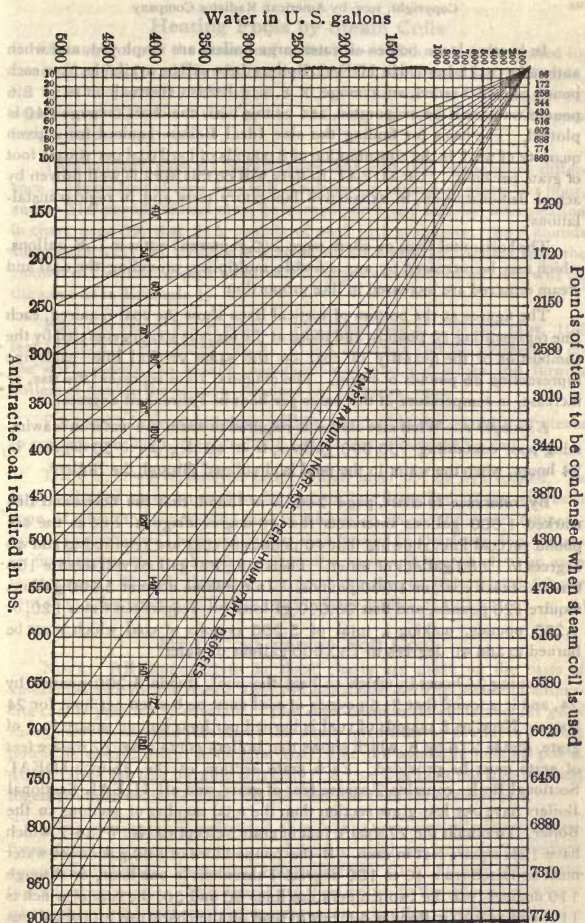


Chart "B"

# Chart to Find Boiler Power Required to Heat Swimming-Pools

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In heating large bodies of water large boilers are employed, and when anthracite coal is burned in IDEAL Boilers there will be available, from each pound of coal burned, an average of 8,333 British thermal units, or 8.6 pounds water will be evaporated, and on this basis the chart on page 240 is plotted. The basis for finding the size Ideal Boiler required for a given quantity of work is the consumption of 8 pounds of hard coal per square foot of grate per hour. That IDEAL Boilers will do this work is well proven by actual demonstration, in exhaustive laboratory tests and in regular installations.

The horizontal lines on chart, page 240, represent water in U.S. gallons, which may be increased by any suitable multiplier, providing the coal and steam required are increased in like proportion.

The figures at the bottom of vertical lines show the coal required, each line representing 10 pounds, and those at the top, the steam generated by the combustion of the quantity of coal on the same vertical line—each line representing 86 pounds of steam. The diagonal lines represent the rise, or increase, in temperature of the water per hour in Fahrenheit degrees.

*Example 1.*—What size Boiler is required to warm the water in a swimming-pool containing 130,000 gallons, from 40 degrees to 80 degrees in 24 hours, when the water in the pool is circulated through the Boiler?

By reference to chart, page 240, it is found that the horizontal line marked 1,000 gallons intersects the 40-degree diagonal line at the 40-pound vertical line, showing that 40 pounds of coal are required to add 40 degrees to 1,000 gallons of water. Then 100,000 gallons will require 100 times as much coal, or 4,000 pounds. In the same manner 3,000 gallons require 120 pounds, and that 30,000 gallons will require ten times 120, or 1,200 pounds, making a total of 5,200 pounds of coal which must be burned to add 40 degrees to 130,000 gallons of water.

Having 24 hours in which to heat the pool, divide 5,200 pounds by 24, and it is found that 216 pounds of coal must be burned per hour for 24 hours. Now, as 8 pounds of coal is burned per hour on one square foot of grate, divide 216 by 8, which shows that boilers containing 27 square feet of grate must be provided. Each grate section of the 36-inch IDEAL Sectional Boiler contains 2 square feet of grate, and all IDEAL Sectional Boilers have *one* less grate section than the total number of sections in the Boiler. To obtain the 27 square feet of grate, select two No. W-36-7, which have  $13\frac{1}{2}$  square feet in each. If the temperature of 500 gallons of water must be raised from 40 to 150 degrees Fahrenheit in one hour, or through 110 degrees, use the two temperature lines 60 and 50, the sum of which is 110, and as 500 gallons is difficult to read on the chart, use 5,000 gallons and divide the product by 10, thus: 60 degrees added to 5,000 gallons require 300 pounds of coal, and 50 degrees added to 5,000 gallons require 250 pounds, a total of 550 pounds; one-tenth of which is 55 pounds, requiring a boiler with a grate area of 7 square feet.



# Chart to Find Boiler Power Required to Heat Swimming-Pools—Continued

## Heating Pools by Steam Coils

*Example 2.*—If the same pool under like conditions is to be heated by steam through pipe coils and the temperature of the steam is 220 degrees, the mean temperature of the water is 40 plus 80 divided by 2 equals 60 degrees and 220 minus 60 equals 160 degrees temperature difference between steam and water.

Turn to chart, page 41, which shows that with this temperature difference 1 square foot of *iron pipe* will condense 36 pounds of steam per hour, and as 216 pounds of coal must be burned per hour, find by interpolation in chart, page 39, that 216 pounds of coal will evaporate 1,857 pounds steam, which divided by 36 will give in round figures 52 square feet, the amount of condensing pipe required. The grate surface of Boilers will be the same as in Example 1.

Fifty-two square feet is equal to 120 lineal feet of 1¼-inch pipe, 104 feet 1½-inch, or 83 feet of 2-inch. If but 12 hours can be allowed to do the work, *double* the *hourly* consumption of coal and steam and furnish boilers of double the capacity required for 24 hours' time.

For the 12-hour period there will be just double the quantity of steam to condense per hour, requiring 104 square feet of condensing coil.

There is, however, another factor which must not be overlooked. In large bodies of water warmed in the manner just described, there will be a zone, of which the condensing pipe is the center, where the mean temperature of the water will be much higher than figured in the foregoing, unless artificial means are employed to agitate the water and keep it all at an even temperature. It will, therefore, be good practice to add at least 50 per cent to the condensing coil when used in large bodies of still water.

## Hard Coal versus Soft Coal

NOTE: All computations in these charts are made on the basis of anthracite coal, for the reason that the *available heating power* of anthracite coal is practically constant. The semi-bituminous coals and all *good caking soft coals* yield just about the same quantities of available heating power as does the best anthracite coal, but the available heating power derived from the free burning soft coal (i. e. coal that does not fuse and mat together under heat), is about 40 per cent less than for caking coals.

When caking coals are burned, they fuse at comparatively low temperatures, forming a crust over the top of the fire which prevents the immediate escape of the volatile gases that comprise from 40 to 50 per cent of the fuel's heating power. These gases are then driven to the side of the fire-pot where they unite with the rising oxygen and, igniting at that point, are converted into valuable heating power.

When free burning coals are used, they disintegrate at comparatively low temperatures and the hydro-carbon gases escape without coming in contact with the necessary oxygen for ignition.

# Relative Efficiency of Iron, Brass, and Copper Pipe when used in Storage Tanks

The chart (page 244) is plotted from a large number of tests made with copper; brass, black and galvanized iron pipe placed *vertically* in a tank of water.

About 80 per cent of the power developed is shown on the chart, leaving 20 per cent as a margin of safety.

When pipe-coils are used in the fire-pot of boilers or hot-air furnaces for heating water or radiation, there is practically no difference in the transmitting power of iron, brass, or copper. For domestic water supply an independent Water Heater should be provided, and connected to an independent chimney flue. If a coil is used an abnormal fire is often maintained for a minor service and fuel is wasted. An independent Water Heater is also desirable, as it can be used in summer, when the heating apparatus is out of use. We strongly recommend in house-heating boilers for Steam and Water that the use of pipe-coils should be discouraged.

The following example shows how to use the chart (page 244):—

*Example:*—It is required to condense 500 pounds of steam per hour in a pipe-coil immersed in the water of a storage tank.

Temperature of steam in pipe .....	220	degrees
Initial temperature of water. ....	40	"
Terminal temperature of water .....	160	"
Mean temperature of water .....	100	"
Temperature difference steam and water.	120	"

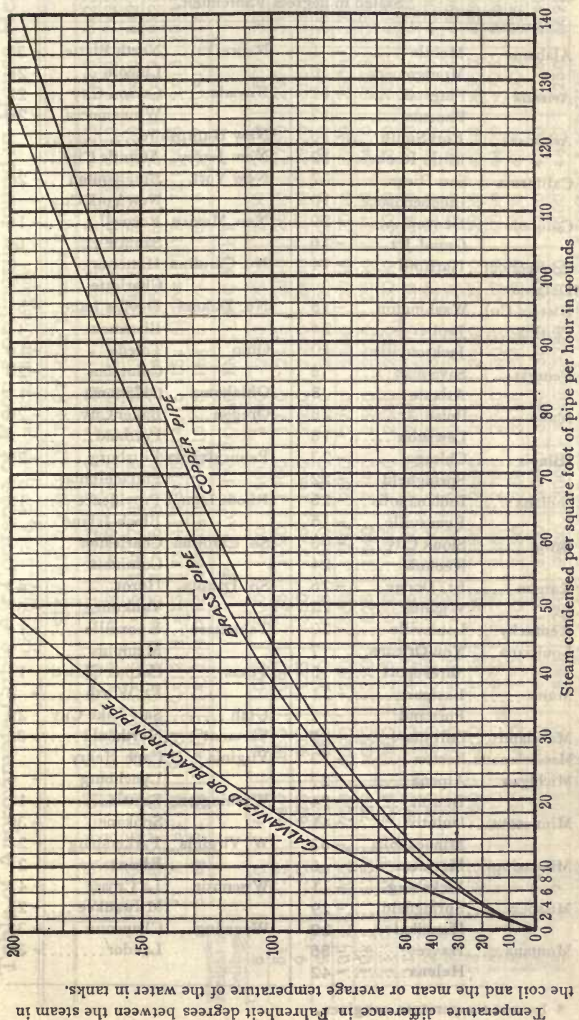
The curved line for galvanized or black pipe on Chart (page 244) crosses the horizontal line of 120 degrees temperature difference at the vertical line representing 24 pounds, which means that one square foot of black or galvanized pipe will condense 24 pounds of steam when the temperature difference is 120 degrees.

The brass-pipe curve shows 51 pounds, and the copper-pipe curve 59 pounds.

The quantity of pipe required in square feet is determined by dividing the 500 pounds of steam which must be condensed per hour by the quantity of steam one square foot of pipe will condense. Thus:—

Iron pipe.....	$\frac{500}{24}$	= 20.8 square feet required.
Brass pipe.....	$\frac{500}{51}$	= 9.8 " " "
Copper pipe.....	$\frac{500}{59}$	= 8.5 " " "

# Chart to determine the Square Feet of Heating Pipe for Storage Tanks





# Lowest Temperatures

Observed at U. S. Weather Bureau Stations

Stated in degrees Fahrenheit.

Alabama.....	Mobile.....	- 1	Nebraska....	North Platte....	- 35
	Montgomery....	- 5		Lincoln.....	- 26
Arizona.....	Flagstaff.....	- 17	Nevada.....	Carson City....	- 22
	Phoenix.....	12		Winnemucca....	- 28
Arkansas....	Fort Smith....	- 15	*New Hampshire.....		
	Little Rock....	- 12	New Jersey..	Atlantic City..	- 7
California...	San Diego.....	32	New York...	Binghamton....	- 26
	Independence..	10		New York City..	- 6
Colorado....	Denver.....	- 29	New Mexico..	Roswell.....	- 18
	Grand Jct.....	- 16		Santa Fe.....	- 13
Connecticut..	Hartford.....	- 14	No. Carolina.	Hatteras.....	8
*Delaware.....				Charlotte.....	- 5
Dist. of Col..	Washington....	- 15	No. Dakota..	Devil's Lake..	- 51
Florida.....	Jupiter.....	24		Bismarck.....	- 44
	Jacksonville...	10	Ohio.....	Toledo.....	- 16
Georgia.....	Savannah.....	8		Columbus.....	- 20
	Atlanta.....	- 8	Oklahoma...	Oklahoma.....	- 17
Idaho.....	Boise.....	- 28	Oregon.....	Baker City....	- 20
	Lewiston.....	- 18		Portland.....	- 2
Illinois.....	Chicago.....	- 23	Pennsylvania	Pittsburg.....	- 20
	Springfield....	- 22		Philadelphia...	- 6
Indiana.....	Indianapolis...	- 25	Rhode Island	Providence....	- 12
	Evansville....	- 15		Block Island..	- 4
Iowa.....	Sioux City....	- 3	So. Carolina.	Charleston....	7
	Keokuk.....	- 24		Columbia.....	- 2
Kansas.....	Ft. Dodge....	- 26	So. Dakota..	Huron.....	- 43
	Wichita.....	- 22		Yankton.....	- 32
Kentucky....	Louisville....	- 20	Tennessee...	Knoxville.....	- 16
Louisiana....	New Orleans...	7		Memphis.....	- 9
	Shreveport....	- 5	Texas.....	Corpus Christi.	11
Maine.....	Eastport.....	- 21		Ft. Worth.....	- 8
	Portland.....	- 17	Utah.....	Salt Lake City..	- 20
Maryland....	Baltimore.....	- 7	Vermont....	Northfield....	- 32
Massachusetts.	Boston.....	- 13	Virginia.....	Cape Henry....	5
Michigan....	Alpena.....	- 27		Lynchburg....	- 6
	Detroit.....	- 24	Washington..	Seattle.....	12
Minnesota...	Duluth.....	- 41		Spokane.....	- 30
	Minneapolis...	- 33	W. Virginia..	Parkersburg...	- 27
Mississippi..	Meridian.....	- 6		Elkins.....	- 21
	Vicksburg.....	- 1	Wisconsin...	La Crosse.....	- 43
Missouri.....	Springfield....	- 29		Milwaukee.....	- 25
	Hannibal.....	- 20	Wyoming....	Cheyenne.....	- 38
Montana.....	Havre.....	- 55		Landor.....	- 36
	Helena.....	- 42			

\* Lowest temperature not given.

# Table of Approximate Cubic Air Contents of Rooms ordinarily found in House Heating

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## SIZE OF ROOMS IN FEET (USE NEAREST SIZE)

3x16½	4x18½	5x20	6x21	7x21½	8x22	9x22	10x22½	11x23	12x23	13x23	14x23	15x23	16x23½	17x23½
4x12½	5x15	6x16½	7x18	8x18½	9x19½	10x20	11x20½	12x21	13x21	14x21½	15x22	16x22	17x22	18x22½
5x10	6x12½	7x14½	8x15½	9x16½	10x17½	11x18	12x18½	13x19	14x20	15x20	16x20	17x20½	18x21½	19x21½
6x8½	7x10½	8x12½	9x14	10x15	11x16	12x16½	13x17½	14x18	15x18	16x18½	17x19½	18x19½	19x20½	20x20
7x7	8x9½	9x11	10x12½	11x13½	12x14½	13x15½	14x16	15x16½	16x17½	17x17½	18x18	19x18	20x19	21x19
8x6½	9x8½	10x10	11x11½	12x12½	13x13½	14x14½	15x15	16x15	17x16	18x16	19x17	20x17	21x18	22x18

## AIR SPACE IN ROOMS IN CUBIC FEET

8	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200
8½	425	640	850	1060	1275	1490	1700	1910	2125	2340	2550	2760	2975	3190	3400
9	450	675	900	1125	1350	1575	1800	2020	2250	2480	2700	2920	3150	3370	3600
9½	475	715	950	1190	1425	1660	1900	2140	2375	2610	2850	3090	3325	3560	3800
10	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000
10½	525	790	1050	1310	1575	1840	2100	2360	2625	2890	3150	3420	3675	3940	4200
11	550	825	1100	1375	1650	1925	2200	2480	2750	3030	3300	3580	3850	4130	4400
11½	575	860	1150	1440	1725	2010	2300	2600	2875	3170	3450	3740	4025	4310	4600
12	600	900	1200	1500	1800	2100	2400	2700	3000	3300	3600	3900	4200	4500	4800
12½	625	940	1250	1560	1875	2190	2500	2820	3125	3440	3750	4070	4375	4690	5000
13	650	980	1300	1625	1950	2280	2600	2930	3250	3580	3900	4240	4550	4880	5200
13½	675	1010	1350	1690	2025	2360	2700	3040	3375	3720	4050	4400	4725	5060	5400
14	700	1050	1400	1750	2100	2450	2800	3160	3500	3860	4200	4550	4900	5250	5600
14½	725	1085	1450	1810	2175	2540	2900	3260	3625	4000	4350	4700	5075	5440	5800
15	750	1125	1500	1880	2250	2620	3000	3380	3750	4140	4500	4880	5250	5625	6000

Table of Cubic Feet of Wall Surface ordinarily found in House Heating



# Table of Square Feet of Wall Surface ordinarily found in House Heating

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RUNNING FEET OF EXPOSED WALL WITHOUT REGARD TO WINDOW OPENINGS		6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.
Height of Ceiling																				
8		48	56	64	72	80	88	96	104	112	120	128	136	144	152	160	168	176	184	192
8½		51	60	68	76	85	94	102	110	119	127	136	145	153	162	170	178	187	195	204
9		54	63	72	81	90	99	108	117	126	135	144	153	162	171	180	189	198	207	216
9½		57	66	76	86	95	105	114	123	133	142	152	161	171	181	190	200	209	218	228
10		60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240
10½		63	73	84	94	105	115	126	136	147	157	168	178	189	199	210	220	231	242	252
11		66	77	88	99	110	121	132	143	154	165	176	187	198	209	220	231	242	253	264
11½		69	80	92	104	115	126	138	149	161	172	184	195	207	218	230	241	253	265	276
12		72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288
12½		75	87	100	112	125	137	150	162	175	187	200	212	225	238	250	262	275	287	300
13		78	91	104	117	130	143	156	169	181	195	208	221	234	247	260	273	286	299	312
14		84	98	112	126	140	154	168	182	196	210	224	238	252	266	280	294	308	322	336
Height of Ceiling		25.	26.	27.	28.	29.	30.	31.	32.	33.	34.	35.	36.	37.	38.	39.	40.	41.	42.	43.
8		200	208	216	224	232	240	248	256	264	272	280	288	296	304	312	320	328	336	344
8½		212	221	230	238	246	255	263	272	280	289	298	306	315	323	332	340	349	357	366
9		225	234	243	252	261	270	279	288	297	306	315	324	333	342	351	360	369	378	387
9½		237	247	256	266	275	285	294	304	313	323	332	342	351	361	370	380	389	399	408
10		250	260	270	280	290	300	310	320	330	340	350	360	370	380	390	400	410	420	430
10½		262	273	283	294	305	315	325	336	346	357	367	378	388	399	409	420	430	441	451
11		275	286	297	308	319	330	341	352	363	374	385	396	407	418	429	440	451	462	473
11½		287	299	310	322	333	345	356	368	379	391	403	414	426	437	449	460	471	483	494
12		300	312	324	336	348	360	372	384	396	408	420	432	444	456	468	480	492	504	516
12½		312	325	337	350	362	375	387	400	412	425	437	450	462	475	487	500	512	525	537
13		325	338	351	364	377	390	403	416	429	442	455	468	481	494	507	520	533	546	559
14		350	364	378	392	406	420	434	448	462	476	490	504	518	532	546	560	574	588	602

# Table of Square Feet of Glass Surface ordinarily found in House Heating

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## WINDOWS—GLASS AND SASH IN SQUARE FEET

Fr-In	3'-0"	3'-6"	4'-0"	4'-6"	4'-9"	5'-0"	5'-3"	5'-6"	5'-9"	6'-0"	6'-3"	6'-6"	6'-9"	7'-0"	7'-3"	7'-6"	7'-9"	8'-0"	8'-6"	9'-0"	Ft-In
1-3	3.7	4.4	5.0	5.6	5.9	6.2	6.6	6.9	7.2	7.5	7.8	8.1	8.4	8.7	9.1	9.4	9.7	10.0	10.6	11.2	1-3
1-6	4.5	5.2	6.0	6.7	7.1	7.5	7.9	8.2	8.6	9.0	9.4	9.7	10.1	10.5	10.9	11.2	11.6	12.0	12.7	13.5	1-6
1-9	5.2	6.1	7.0	7.9	8.3	8.7	9.2	9.6	10.1	10.5	10.9	11.4	11.8	12.2	12.7	13.1	13.6	14.0	14.9	15.7	1-9
2-0	6.0	7.0	8.0	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	17.0	18.0	2-0
2-3	6.7	7.9	9.0	10.1	10.7	11.2	11.8	12.4	12.9	13.5	14.1	14.6	15.2	15.7	16.3	16.9	17.4	18.0	19.1	20.2	2-3
2-6	7.5	8.7	10.0	11.2	11.9	12.5	13.1	13.7	14.4	15.0	15.7	16.2	16.9	17.5	18.1	18.7	19.3	20.0	21.2	22.5	2-6
2-9	8.2	9.6	11.0	12.3	13.0	13.7	14.4	15.1	15.8	16.5	17.2	17.9	18.6	19.2	19.9	20.6	21.3	22.0	23.4	24.7	2-9
3-0	9.0	10.5	12.0	13.5	14.2	15.0	15.8	16.5	17.2	18.0	18.7	19.5	20.2	21.0	21.7	22.5	23.2	24.0	25.5	27.0	3-0
3-3	9.7	11.4	13.0	14.6	15.4	16.2	17.0	17.8	18.7	19.5	20.3	21.1	21.9	22.7	23.6	24.4	25.2	26.0	27.6	29.2	3-3
3-6	10.5	12.2	14.0	15.7	16.6	17.5	18.4	19.2	19.9	21.0	21.9	22.7	23.6	24.5	25.4	26.2	27.1	28.0	29.7	31.5	3-6
3-9	11.2	13.1	15.0	16.9	17.8	18.7	19.7	20.6	21.6	22.5	23.4	24.4	25.3	26.2	27.2	28.1	29.1	30.0	31.9	33.7	3-9
4-0	12.0	14.0	16.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	31.0	32.0	34.0	36.0	4-0
4-3	12.7	14.8	17.0	19.1	20.2	21.2	22.3	23.4	24.4	25.5	26.7	27.6	28.7	29.7	30.8	31.9	32.9	34.0	36.1	38.2	4-3
4-6	13.5	15.7	18.0	20.2	21.4	22.5	23.6	24.7	25.9	27.0	28.1	29.2	30.4	31.5	32.6	33.7	34.9	36.0	38.2	40.5	4-6
4-9	14.2	16.6	19.0	21.4	22.6	23.7	24.9	26.1	27.3	28.5	29.7	30.9	32.0	33.2	34.4	35.6	36.8	38.0	40.4	42.7	4-9
5-0	15.0	17.5	20.0	22.5	23.7	25.0	26.2	27.5	28.7	30.0	31.2	32.5	33.7	35.0	36.2	37.5	38.7	40.0	42.5	45.0	5-0
5-3	15.7	18.4	21.0	23.6	24.9	26.2	27.6	28.9	30.2	31.5	32.8	34.1	35.4	36.7	38.1	39.4	40.7	42.0	44.6	47.2	5-3
5-6	16.5	19.2	22.0	24.7	26.1	27.5	28.9	30.2	31.6	33.0	34.4	35.7	37.1	38.5	39.9	41.2	42.6	44.0	46.7	49.5	5-6
5-9	17.2	20.1	23.0	25.9	27.3	28.7	30.2	31.6	33.0	34.5	35.8	37.4	38.8	40.2	41.7	43.1	44.6	46.0	48.9	51.7	5-9
6-0	18.0	21.0	24.0	27.0	28.5	30.0	31.5	33.0	34.5	36.0	37.5	39.0	40.5	42.0	43.5	45.0	46.5	48.0	51.0	54.0	6-0

# Square Feet of Radiating Surface of Pipe per Lineal Foot

On all lengths over one foot, fractions less than tenths are added to or dropped.

Length of Pipe	SIZE OF PIPE											
	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	4	5	6	7	8
1	.275	.346	.434	.494	.622	.753	.916	1.175	1.455	1.739	1.996	2.257
2	.5	.7	.9	1.	1.2	1.5	1.8	2.4	2.9	3.5	4.	4.5
3	.8	1.	1.3	1.5	1.9	2.3	2.7	3.5	4.4	5.2	6.	6.8
4	1.1	1.4	1.7	2.	2.5	3.	3.6	4.7	5.8	7.	8.	9.
5	1.4	1.7	2.2	2.4	3.1	3.8	4.6	5.8	7.3	7.7	10.	11.3
6	1.6	2.1	2.6	2.9	3.7	4.5	5.5	7.	8.7	10.5	12.	13.5
7	1.9	2.4	3.	3.4	4.4	5.3	6.4	8.2	10.2	12.1	14.	15.8
8	2.2	2.8	3.5	3.9	5.	6.	7.3	9.4	11.6	13.9	16.	18.
9	2.5	3.1	3.9	4.4	5.6	6.8	8.2	10.6	13.1	15.7	18.	20.3
10	2.7	3.5	4.3	4.9	6.2	7.5	9.1	11.8	14.6	17.4	20.	22.6
11	3.	3.8	4.8	5.4	6.8	8.3	10.	12.9	16.	19.1	22.	24.9
12	3.3	4.1	5.2	5.9	7.5	9.	11.	14.1	17.4	20.9	24.	27.1
13	3.6	4.5	5.6	6.4	8.1	9.8	11.9	15.3	18.9	22.6	26.	29.4
14	3.8	4.8	6.1	6.9	8.7	10.5	12.8	16.5	20.3	24.3	28.	31.6
15	4.1	5.2	6.5	7.4	9.3	11.3	13.7	17.6	21.8	26.1	30.	33.9
16	4.4	5.5	6.9	7.9	10.	12.	14.6	18.8	23.2	27.8	32.	36.1
17	4.7	5.9	7.4	8.4	10.6	12.8	15.5	20.	24.7	29.5	34.	38.4
18	5.	6.2	7.8	8.9	11.2	13.5	16.5	21.2	26.2	31.3	36.	40.6
19	5.2	6.6	8.3	9.4	11.8	14.3	17.4	22.3	27.6	33.1	38.	42.9
20	5.5	6.9	8.7	9.9	12.5	15.	18.3	23.5	29.1	34.8	40.	45.2
21	5.8	7.3	9.1	10.4	13.	15.8	19.2	24.7	30.5	36.5	42.	47.4
22	6.	7.6	9.6	10.9	13.7	16.5	20.2	25.9	32.	38.3	44.	49.7
23	6.3	8.	10.	11.3	14.3	17.3	21.1	27.	33.5	40.	46.	52.
24	6.6	8.3	10.4	11.9	14.9	18.	22.	28.2	34.9	41.7	48.	54.2
25	6.9	8.6	10.9	12.3	15.6	18.8	22.9	29.3	36.3	43.5	50.	56.4
26	7.1	9.	11.3	12.8	16.2	19.5	23.8	30.5	37.8	45.2	52.	58.6
27	7.4	9.4	11.7	13.3	16.8	20.3	24.7	31.7	39.3	47.	54.	61.
28	7.7	9.7	12.2	13.8	17.4	21.	25.6	32.9	40.7	48.7	56.	63.2
29	8.	10.	12.6	14.3	18.	21.8	26.6	34.1	42.2	50.4	58.	65.5
30	8.3	10.4	13.	14.8	18.7	22.5	27.5	35.3	43.6	52.1	60.	67.7
31	8.5	10.7	13.5	15.3	19.3	23.3	28.4	36.4	45.1	53.9	62.	70.
32	8.8	11.1	13.9	15.8	19.9	24.1	29.3	37.6	46.5	55.6	64.	72.2
33	9.1	11.4	14.3	16.3	20.5	24.8	30.2	38.8	48.	57.4	66.	74.4
34	9.4	11.7	14.7	16.8	21.2	25.6	31.1	40.	49.5	59.1	68.	76.7
35	9.6	12.1	15.2	17.3	21.8	26.3	32.	41.1	50.9	60.8	70.	79.
36	9.9	12.5	15.6	17.8	22.4	27.	33.	42.3	52.4	62.6	72.	81.3
37	10.2	12.8	16.1	18.3	23.	27.8	33.9	43.5	53.8	64.3	74.	83.5
38	10.5	13.2	16.5	18.8	23.7	28.5	34.8	44.6	55.2	66.	76.	85.8
39	10.7	13.5	16.9	19.3	24.3	29.3	35.7	45.8	56.7	67.8	78.	88.
40	11.	13.8	17.4	19.8	24.9	30.1	36.6	47.	58.2	69.5	80.	90.2
41	11.3	14.2	17.8	20.3	25.5	30.8	37.6	48.2	59.6	71.3	82.	92.5
42	11.5	14.5	18.2	20.8	26.1	31.6	38.5	49.4	61.1	73.	84.	94.8
43	11.8	14.9	18.7	21.3	26.8	32.3	39.4	50.6	62.5	74.8	86.	97.
44	12.1	15.2	19.1	21.8	27.4	33.1	40.3	51.7	64.	76.5	88.	99.3
45	12.4	15.6	19.5	22.2	28.	33.8	41.2	52.9	65.5	78.2	90.	101.6
46	12.7	15.9	20.	22.7	28.6	34.6	42.2	54.	67.	80.	92.	103.8
47	12.9	16.3	20.4	23.2	29.2	35.3	43.	55.2	68.4	81.7	94.	106.
48	13.2	16.6	20.8	23.7	29.9	36.1	43.9	56.4	69.8	83.5	96.	108.4
49	13.5	17.	21.3	24.2	30.5	36.8	44.8	57.6	71.2	85.1	98.	110.5
50	13.8	17.3	21.7	24.7	31.1	37.6	45.8	58.7	72.7	87.	100.	112.8

NOTE.—Above information is quoted from standard authorities. Not guaranteed.



# Areas of Circles

Size	Area	Size	Area	Size	Area	Size	Area
$\frac{1}{8}$	0.0123	10	78.54	30	706.86	65	3318.3
$\frac{1}{4}$	0.0491	$\frac{1}{2}$	86.59	31	754.76	66	3421.2
$\frac{3}{8}$	0.1104	11	95.03	32	804.24	67	3525.6
$\frac{1}{2}$	0.1963	$\frac{1}{2}$	103.86	33	855.30	68	3631.6
$\frac{5}{8}$	0.3067	12	113.09	34	907.92	69	3739.2
$\frac{3}{4}$	0.4417	$\frac{1}{2}$	122.71	35	962.11	70	3848.4
$\frac{7}{8}$	0.6013	13	132.73	36	1017.8	71	3959.2
1	0.7854	$\frac{1}{2}$	143.13	37	1075.2	72	4071.5
$\frac{1}{8}$	0.9940	14	153.93	38	1134.1	73	4185.3
$\frac{1}{4}$	1.227	$\frac{1}{2}$	165.13	39	1194.5	74	4300.8
$\frac{3}{8}$	1.484	15	176.71	40	1256.6	75	4417.8
$\frac{1}{2}$	1.767	$\frac{1}{2}$	188.69	41	1320.2	76	4536.4
$\frac{5}{8}$	2.073	16	201.06	42	1385.4	77	4656.0
$\frac{3}{4}$	2.405	$\frac{1}{2}$	213.82	43	1452.2	78	4778.3
$\frac{7}{8}$	2.761	17	226.98	44	1520.5	79	4901.6
2	3.141	$\frac{1}{2}$	240.52	45	1590.4	80	5026.5
$\frac{1}{4}$	3.976	18	254.46	46	1661.9	81	5153.0
$\frac{1}{2}$	4.908	$\frac{1}{2}$	268.80	47	1734.9	82	5281.0
$\frac{3}{4}$	5.939	19	283.52	48	1809.5	83	5410.6
3	7.068	$\frac{1}{2}$	298.64	49	1885.7	84	5541.7
$\frac{1}{4}$	8.295	20	314.16	50	1963.5	85	5674.5
$\frac{1}{2}$	9.621	$\frac{1}{2}$	330.06	51	2042.8	86	5808.8
$\frac{3}{4}$	11.044	21	346.36	52	2123.7	87	5944.6
4	12.566	$\frac{1}{2}$	363.05	53	2206.1	88	6082.1
$\frac{1}{2}$	15.904	22	380.13	54	2290.2	89	6221.1
5	19.635	$\frac{1}{2}$	397.60	55	2375.8	90	6361.7
$\frac{1}{2}$	23.758	23	415.47	56	2463.0	91	6503.8
6	28.274	$\frac{1}{2}$	433.73	57	2551.7	92	6647.6
$\frac{1}{2}$	33.183	24	452.39	58	2642.0	93	6792.9
7	38.484	$\frac{1}{2}$	471.43	59	2733.9	94	6939.7
$\frac{1}{2}$	44.178	25	490.87	60	2827.4	95	7088.2
8	50.265	26	530.93	61	2922.4	96	7238.2
$\frac{1}{2}$	56.745	27	572.55	62	3019.0	97	7389.8
9	63.617	28	615.75	63	3117.2	98	7542.9
$\frac{1}{2}$	70.882	29	660.52	64	3216.9	99	7697.7

To find the diameter of a circle when circumference is given, multiply the given circumference by .31831.

# Circumference of Circles

Size	Circumference	Size	Circumference	Size	Circumference	Size	Circumference
$\frac{1}{8}$	.3927	10	31.416	30	94.248	65	204.204
$\frac{1}{4}$	.7854	$\frac{1}{2}$	32.987	31	97.389	66	207.345
$\frac{3}{8}$	1.1781	11	34.558	32	100.531	67	210.487
$\frac{1}{2}$	1.5708	$\frac{1}{2}$	36.128	33	103.673	68	213.628
$\frac{5}{8}$	1.9635	12	37.699	34	106.814	69	216.770
$\frac{3}{4}$	2.3562	$\frac{1}{2}$	39.270	35	109.956	70	219.911
$\frac{7}{8}$	2.7489	13	40.841	36	113.097	71	223.053
1	3.1416	$\frac{1}{2}$	42.412	37	116.239	72	226.195
$\frac{1}{8}$	3.5343	14	43.982	38	119.381	73	229.336
$\frac{1}{4}$	3.9270	$\frac{1}{2}$	45.553	39	122.522	74	232.478
$\frac{3}{8}$	4.3197	15	47.124	40	125.664	75	235.619
$\frac{1}{2}$	4.7124	$\frac{1}{2}$	48.695	41	128.805	76	238.761
$\frac{5}{8}$	5.1051	16	50.265	42	131.947	77	241.903
$\frac{3}{4}$	5.4978	$\frac{1}{2}$	51.836	43	135.088	78	245.044
$\frac{7}{8}$	5.8905	17	53.407	44	138.230	79	248.186
2	6.2832	$\frac{1}{2}$	54.978	45	141.372	80	251.327
$\frac{1}{4}$	7.0686	18	56.549	46	144.513	81	254.469
$\frac{1}{2}$	7.8540	$\frac{1}{2}$	58.119	47	147.655	82	257.611
$\frac{3}{4}$	8.6394	19	59.690	48	150.796	83	260.752
3	9.4248	$\frac{1}{2}$	61.261	49	153.938	84	263.894
$\frac{1}{4}$	10.210	20	62.832	50	157.080	85	267.035
$\frac{1}{2}$	10.996	$\frac{1}{2}$	64.403	51	160.221	86	270.177
$\frac{3}{4}$	11.781	21	65.973	52	163.363	87	273.319
4	12.566	$\frac{1}{2}$	67.544	53	166.504	88	276.460
$\frac{1}{2}$	14.137	22	69.115	54	169.646	89	279.602
5	15.708	$\frac{1}{2}$	70.686	55	172.788	90	282.743
$\frac{1}{2}$	17.279	23	72.257	56	175.929	91	285.885
6	18.850	$\frac{1}{2}$	73.827	57	179.071	92	289.027
$\frac{1}{2}$	20.420	24	75.398	58	182.212	93	292.168
7	21.991	$\frac{1}{2}$	76.969	59	185.354	94	295.310
$\frac{1}{2}$	23.562	25	78.540	60	188.496	95	298.451
8	25.133	26	81.681	61	191.637	96	301.593
$\frac{1}{2}$	26.704	27	84.823	62	194.779	97	304.734
9	28.274	28	87.965	63	197.920	98	307.876
$\frac{1}{2}$	29.845	29	91.106	64	201.062	99	311.018

To find the circumference of a circle when diameter is given, multiply the given diameter by 3.1416.



## To properly erect Coal, Coke and Wood Burning Sectional Steam and Water Boilers

Set up and bolt together squarely the four pieces comprising the base, on a level brick or concrete foundation, which is at least a foot larger all round than the base.

Place all of the grates in position and connect them to the horizontal shaking bar underneath them. Connect this bar through the front of the base to the angle shaking lever, which is fastened to the front section by means of a bracket.

Place on top of the base, and close up against the base front the front section, which is marked No. 1. Wipe clean its three nipple holes, also any three of the connecting nipples; smear them with good lubricating oil; place them in the front section; add the second section marked No. 2, after having carefully wiped clean its six nipple holes, pushing the section up until its front nipple holes register with the nipples already placed in the front section. Jar section No. 2 up close to the first one with a piece of timber. Place the four long connecting bolts in their holes, slipping on each, at the rear, one of the square wood washers which we supply. Screw up *equally all around*, meanwhile striking the rear section, in the vicinity of the three connecting holes, with a block of wood and a good heavy hammer.

When the sections are within  $\frac{1}{4}$  or  $\frac{1}{8}$  of an inch of each other (*square all round*) then insert four wooden wedges, which are to go between each and every section before they are pulled up any further, one on each side just above the lower connecting nipples and two on top. These two as far away from the upper connecting nipple as possible. Then screw a little more on the nuts until the wedges have been bitten by the two sections, and the sections have been drawn together from center to center of each section the following distances :

15" Coal Burning Boiler 6 $\frac{1}{4}$ " from Center to Center of Sections.

18"	"	"	"	6"	"	"	"	"	"	"
-----	---	---	---	----	---	---	---	---	---	---

21"	"	"	"	7"	"	"	"	"	"	"
22"	"	"	"	7 1/2"	"	"	"	"	"	"

22" " " " 71" " " " " " "

24"	"	"	"	7 1/4"	"	"	"	"	"
28"	"	"	"	8"	"	"	"	"	"

28'	"	"	"	8'	"	"	"	"	"	"
30"	"	"	"	7 1/2"	"	"	"	"	"	"

36"	"	"	"	7 1/4"	"	"	"	"	"
36"	"	"	"	8 1/4"	"	"	"	"	"

For new 36 and 48-inch Boilers see pamphlet sent with Boiler.

No. 1 Coke Burning Boiler 4" from Center to Center of Sections.

"	2	"	"	"	"	5 $\frac{1}{2}$ "	"	"	"	"
"	-	"	"	"	"	"	"	"	"	"

"	3	"	"	"	6"	"	"	"	"	"
"	4	"	"	"	7 1/2"	"	"	"	"	"

"	4	"	"	"	7 1/4"	"	"	"	"	"	"
"	5	"	"	"	8 1/4"	"	"	"	"	"	"

Then remove the screw rods, add the next section, precisely as before, and repeat the operation just described, sawing off each time, where they have been marked, a portion of the square wood washers.

If impossible to begin to erect at the front section of boiler, start with the back section, as above described.

After boiler has been assembled complete, be sure to cement all joints (which are all points of contact) between sections, breaking off the wood wedges, allowing their points to remain undisturbed between the sections, applying cement over them. Cement all joints in base and between base and foundation, remembering that all air for combustion should enter only through the draft doors.

Smoke pipe and all connections between boiler and flue should be air tight (a leak in the smoke pipe or flue is like a leak in a suction pump).

Do not bush the flow outlets in steam dome. Connect all of them to the flow pipe system, using size of pipe called for by outlets.

Do not expect the boiler to do good work until the system has been thoroughly cleared of oil.

A good damper (accessible and easily handled) in smoke pipe near chimney, provided with means for clamping in order that it may remain where desired, is usually very necessary for draft regulation and fuel saving.

No boiler will operate successfully on a weak draft, nor will it give satisfaction on a strong draft *if the flue area is too small*. (Do not mistake velocity for volume. A test by burning paper in a flue proves nothing.)

Each pound of coal requires for its complete combustion about three hundred cubic feet of air.

To draw this amount of air through the grates, ashes and fuel bed, over various heating surfaces and through flues, the proper area and height of chimney are essential.

## Air Heating Table

Cubic feet of air one B. t. u. will raise one degree Fahr. at different temperatures:

Specific heat of air .2375. At zero one cubic foot of air weighs .0864 lbs, and  $\frac{1 \text{ lb.}}{.0864} = 11.574 \text{ cu. ft.}$   $\frac{11.574}{.2375} = 48.77 \text{ cu. ft.}$  raised one degree by 1 B. t. u.

From this formula the following table is constructed, small fractional decimals being omitted.

Temp. air F. Deg.	Weight of 1 cu. ft.	Cu. ft. in 1 lb.	Cu. ft. 1 H. U. will raise 1 deg. F.	Temp. air F. Deg.	Weight of 1 cu. ft.	Cu. ft. in 1 lb.	Cu. ft. 1 H. U. will raise 1 deg. F.
0	.0864	11.58	48.77	112	.0694	14.40	60.60
12	.0842	11.87	50.00	122	.0682	14.65	61.60
22	.0824	12.14	51.00	132	.0671	14.90	62.80
32	.0807	12.40	52.20	142	.0660	15.15	63.80
42	.0791	12.64	53.10	152	.0649	15.40	64.90
52	.0776	12.88	54.10	162	.0638	15.65	66.00
62	.0761	13.13	55.20	172	.0628	15.90	67.00
70	.0750	13.34	56.30	182	.0618	16.17	68.00
72	.0747	13.39	56.40	192	.0609	16.42	69.10
82	.0733	13.64	57.40	202	.0600	16.67	70.10
92	.0720	13.90	58.60	212	.0591	16.92	71.30
102	.0707	14.14	59.20				

## Factors for Equivalent Evaporation

Tempera- ture Feed Water	Gauge Pressure		Tempera- ture Feed Water	Gauge Pressure	
	0 to 5 lbs.	5 to 10 lbs.		0 to 5 lbs.	5 to 10 lbs.
32	1.1876	1.1962	113	1.1036	1.1122
35	1.1845	1.1931	116	1.1005	1.1090
38	1.1814	1.1900	119	1.0974	1.1059
41	1.1783	1.1868	122	1.0943	1.1028
44	1.1752	1.1837	125	1.0912	1.0997
47	1.1721	1.1806	128	1.0881	1.0966
50	1.1690	1.1775	131	1.0849	1.0934
53	1.1659	1.1744	134	1.0818	1.0903
56	1.1628	1.1713	137	1.0787	1.0872
59	1.1597	1.1682	140	1.0756	1.0841
62	1.1566	1.1651	143	1.0724	1.0810
65	1.1535	1.1620	146	1.0693	1.0778
68	1.1504	1.1589	149	1.0662	1.0747
71	1.1472	1.1558	152	1.0631	1.0716
74	1.1441	1.1526	155	1.0599	1.0684
77	1.1410	1.1495	158	1.0568	1.0653
80	1.1379	1.1464	161	1.0537	1.0622
83	1.1348	1.1433	164	1.0505	1.0591
86	1.1317	1.1402	167	1.0474	1.0559
89	1.1286	1.1371	170	1.0443	1.0528
92	1.1255	1.1340	173	1.0411	1.0497
95	1.1223	1.1309	176	1.0380	1.0465
98	1.1192	1.1277	179	1.0349	1.0434
101	1.1161	1.1246	182	1.0317	1.0403
104	1.1130	1.1215	185	1.0286	1.0371
107	1.1099	1.1184	188	1.0255	1.0340
110	1.1068	1.1153	191	1.0223	1.0308

The factor of equivalent evaporation means the percentage of difference between the amount of water actually evaporated from a certain temperature of feed water and at a certain definite gauge pressure as compared with feed water 212° and atmospheric pressure.

# Temperature of Steam in Boiler and Pressure per Square Inch

Temperature of Steam in Pipes	Temperature of Steam in Boiler	PRESSURE PER SQUARE INCH IN BOILER	
		Pressure of Atmosphere	
		Included	Excluded
210°	221.0°	17.67	2.94
220°	231.5°	21.38	6.65
230°	242.0°	25.75	11.02
240°	256.5°	32.89	19.16
250°	263.0°	36.58	21.85
260°	273.5°	43.31	28.58
270°	284.0°	51.04	36.31
280°	295.0°	60.25	45.52
290°	305.0°	69.77	55.04
300°	315.0°	80.98	66.25

## B. T. U. Required for Heating Air

This table specifies the units of heat required per square foot per hour of heating surface to heat one cubic foot of air at different temperatures.

Extern'l Temp.	Temperature of Air in Room									
	40°	50°	60°	70°	80°	90°	100°	110°	120°	130°
-40°	1.802	2.027	2.252	2.479	2.703	2.928	3.154	3.379	3.604	3.829
-30°	1.540	1.760	1.980	2.200	2.420	2.640	2.860	3.080	3.300	3.520
-20°	1.290	1.505	1.720	1.935	2.150	2.365	2.580	2.795	3.010	3.225
-10°	1.051	1.262	1.473	1.684	1.892	2.102	2.311	2.522	2.732	2.943
0°	0.822	1.028	1.234	1.439	1.645	1.851	2.056	2.262	2.467	2.673
10°	0.604	0.805	1.007	1.208	1.409	1.611	1.812	2.013	2.215	2.416
20°	0.393	0.590	0.787	0.984	1.181	1.378	1.575	1.771	1.968	2.165
30°	0.192	0.385	0.578	0.770	0.963	1.155	1.345	1.540	1.733	1.925
40°	0.000	0.188	0.376	0.564	0.752	0.940	1.128	1.316	1.504	1.692
50°	0.000	0.000	0.184	0.367	0.551	0.735	0.918	1.102	1.286	1.470
60°	0.000	0.000	0.000	0.179	0.359	0.538	0.718	0.897	1.077	1.256
70°	0.000	0.000	0.000	0.000	0.175	0.350	0.525	0.700	0.875	1.049

Above tables from F. Schumann's Manual of Heating and Ventilation, pages 64 and 41.



# Velocity of Flow of Water

In Feet per Minute, Through Pipes of Various Sizes, for Varying Quantities of Flow

Gals. per Minute	$\frac{3}{4}$ inch	1 inch	1 $\frac{1}{4}$ inch	1 $\frac{1}{2}$ inch	2 inch	2 $\frac{1}{2}$ inch	3 inch	4 inch
5	218	122 $\frac{1}{2}$	78 $\frac{1}{2}$	54 $\frac{1}{2}$	30 $\frac{1}{2}$	19 $\frac{1}{2}$	13 $\frac{1}{2}$	7 $\frac{2}{3}$
10	436	245	157	109	61	38	27	15 $\frac{1}{3}$
15	653	367 $\frac{1}{2}$	235 $\frac{1}{2}$	163 $\frac{1}{2}$	91 $\frac{1}{2}$	58 $\frac{1}{2}$	40 $\frac{1}{2}$	23
20	872	490	314	218	122	78	54	30 $\frac{2}{3}$
25	1090	612 $\frac{1}{2}$	392 $\frac{1}{2}$	272 $\frac{1}{2}$	152 $\frac{1}{2}$	97 $\frac{1}{2}$	67 $\frac{1}{2}$	38 $\frac{1}{3}$
30		735	451	327	183	117	81	46
35		857 $\frac{1}{2}$	549 $\frac{1}{2}$	381 $\frac{1}{2}$	213 $\frac{1}{2}$	136 $\frac{1}{2}$	94 $\frac{1}{2}$	53 $\frac{2}{3}$
40		980	628	436	244	156	108	61 $\frac{1}{3}$
45		1102 $\frac{1}{2}$	706 $\frac{1}{2}$	490 $\frac{1}{2}$	274 $\frac{1}{2}$	175 $\frac{1}{2}$	121 $\frac{1}{2}$	69
50			785	545	305	195	135	76 $\frac{2}{3}$
75			1177 $\frac{1}{2}$	817 $\frac{1}{2}$	457 $\frac{1}{2}$	292 $\frac{1}{2}$	202 $\frac{1}{2}$	115
100				1090	610	380	270	153 $\frac{1}{3}$
125					762 $\frac{1}{2}$	487 $\frac{1}{2}$	337 $\frac{1}{2}$	191 $\frac{2}{3}$
150					915	585	405	230
175					1067 $\frac{1}{2}$	682 $\frac{1}{2}$	472 $\frac{1}{2}$	268 $\frac{1}{3}$
200					1220	780	540	306 $\frac{2}{3}$

## Number of Gallons in Tanks

Length or Depth in Feet	Diameter in Inches									
	18	24	30	36	42	48	54	60	66	72
2	26	47	73	105	144	188	238	294	356	424
2 $\frac{1}{2}$	33	59	90	131	180	235	298	367	445	530
3	40	71	109	157	216	282	357	440	534	636
3 $\frac{1}{2}$	47	83	127	183	252	329	416	513	623	742
4	54	95	145	209	288	376	475	586	712	848
4 $\frac{1}{2}$	61	107	163	235	324	423	534	659	801	954
5	68	119	180	261	360	470	593	732	890	1060
5 $\frac{1}{2}$	75	131	200	287	396	517	652	805	979	1166
6	82	143	217	313	432	564	711	878	1068	1272
6 $\frac{1}{2}$	89	155	235	339	468	611	770	951	1157	1378
7	96	167	253	365	504	658	829	1024	1246	1484
7 $\frac{1}{2}$	103	179	271	391	540	705	888	1097	1335	1590
8	110	191	289	417	576	752	947	1170	1424	1696
8 $\frac{1}{2}$	.....	203	307	443	612	799	1006	1243	1513	1802
10	.....	239	361	521	720	940	1183	1462	1780	2120
12	.....	287	433	625	864	1128	1419	1754	2136	2544
14	.....	.....	.....	.....	1008	1316	1655	2046	2492	2968
16	.....	.....	.....	.....	1152	1504	1891	2338	2848	3392
18	.....	.....	.....	.....	.....	.....	2127	2630	3204	3816
20	.....	.....	.....	.....	.....	.....	2363	2922	3560	4240

NOTE.—Above information is quoted from standard authorities, Not guaranteed.

# Properties of Saturated Steam

From "Notes on Heating and Ventilation" by John R. Allen,  
page No. 39.

Pressure or Vacuum	Tempera- ture	Heat of the liquid	Latent Heat	Total Heat	Volume of 1 lb. of steam cubic feet
Pounds per sq. in.					
-12	137	105	1019	1124	135
-10	160	128	1003	1131	78.3
-8	175	143	992	1135	55.9
-6	187	155	984	1139	43.6
-4	197	165	977	1142	35.8
-2	205	173	971	1144	30.6
0	212	180.9	965.7	1146.6	26.36
1	215	184	964	1148	25
2	219	188	961	1149	23
3	222	191	959	1150	22.3
4	224	193	957	1150.5	21.2
5	227	196	955	1151	20.16
10	239	208	946	1154	16.3
15	249	218.8	939.3	1158.1	13.7
20	258.7	228	932.5	1161	11.85
25	266.7	236.2	927.1	1163.3	10.36
30	273.9	243.5	922	1165.5	9.34
35	280.5	250.2	917.3	1167.5	8.45
40	286.5	256.3	913	1169.3	7.73
45	292.2	262.1	909	1171.1	7.11
50	297.5	267.5	905.2	1172.7	6.61
55	302.4	272.6	901.6	1174.2	6.16
60	307.1	277.2	898.4	1175.6	5.77
65	311.5	281.8	895.1	1176.9	5.43
70	315.8	286.1	892.1	1178.2	5.13
75	319.8	290.3	889.1	1179.4	4.86
80	323.7	294.3	886.3	1180.6	4.63
85	327.4	298.1	883.6	1181.7	4.41
90	330.9	301.8	881	1182.8	4.20
95	334.4	305.4	878.5	1183.9	4.02
100	337.6	308.9	876	1184.9	3.83
110	343.9	315.4	871.4	1186.8	3.57
120	349.8	321.5	867.1	1188.6	3.33
130	355	327.5	863	1190.3	3.1
140	360	333.5	859.1	1191.9	2.92
150	365.7	338.3	855.4	1193.4	2.75

## Pressure of Water for Each Foot in Height

Feet in Height	Pounds per Square Inch	Feet in Height	Pounds per Square Inch	Feet in Height	Pounds per Square Inch
1	.43	15	6.49	50	21.65
2	.86	20	8.66	70	30.32
5	2.16	25	10.82	80	34.65
10	4.33	40	17.32	100	43.31

NOTE.—Above information is quoted from standard authorities. Not guaranteed.



# Steam Pipes

## Heated Body of Cast Iron

Unit of heat, emitted or absorbed, per square foot per hour:

Mean Temp. of Heated Body, Pipe, Etc.	Temp. of Air and Walls	UNITS OF HEAT PER SQUARE FOOT PER HOUR				
		By Contact		By Radiation	By Radiation and Contact Combined	
		Air Quiet	Air Moving		Air Quiet	Air Moving
210	70	130.49	217.48	139.96	270.49	357.48
220	70	142.20	237.00	155.27	297.47	392.27
230	70	153.95	256.58	169.56	323.51	426.14
240	70	165.90	279.83	184.58	350.48	464.41
250	70	178.00	296.66	200.18	378.18	496.84
260	70	189.90	316.50	214.36	404.26	530.86
270	70	202.70	337.83	233.42	436.12	571.25
280	70	215.30	358.85	251.21	466.51	610.06
290	70	228.55	380.91	267.73	496.28	648.64
300	70	240.85	401.41	279.12	519.97	680.53

## Hot Water Pipes

### Heated Body of Cast Iron

Unit of heat, emitted or absorbed, per square foot per hour:

Mean Temp. of Heated Body, Pipe, Etc.	Temp. of Air and Walls	UNITS OF HEAT PER SQUARE FOOT PER HOUR				
		By Contact		By Radiation	By Radiation and Contact Combined	
		Air Quiet	Air Moving		Air Quiet	Air Moving
70	70	0.	0.	0.	0.	0.
80	70	5.04	8.40	7.43	12.47	15.83
90	70	11.84	19.73	15.31	27.15	35.04
100	70	19.53	32.55	23.47	43.00	56.02
110	70	27.86	46.43	31.93	59.79	78.36
120	70	36.66	61.10	40.82	77.48	101.92
130	70	45.90	76.50	50.00	95.90	126.50
140	70	55.51	92.52	59.63	115.14	152.15
150	70	65.45	109.18	69.69	135.14	178.87
160	70	75.68	126.13	80.19	155.87	206.32
170	70	86.18	143.30	91.12	177.30	234.42
180	70	96.93	161.55	102.50	199.43	264.05
190	70	107.90	179.83	114.45	222.35	294.28
200	70	119.13	198.55	127.00	246.13	325.55
210	70	130.49	217.48	139.96	270.49	357.48

Above tables from F. Schumann's Manual of Heating and Ventilation, pages 39-40.

# Surface of Wrought Iron Pipe

Inside diameter Inches	1	1¼	1½	2	2½	3	3½	4	5	6
Length of Pipe per square foot of external surface	2.9	2.3	2.0	1.6	1.32	1.09	0.95	0.84	0.68	0.57
Square feet surface per 1 lineal foot	0.34	0.43	0.50	0.62	0.75	0.92	1.05	1.18	1.46	1.74

## Dimensions of Standard Wrought Iron Pipe

We do not handle or quote prices on Pipe

Nominal Inside Diam. Inches	Actual Diameter Inches		Thick- ness Inches	Circumference Inches		Area Square Inches	
	Inside	Outside		Internal	External	Internal	External
⅛	.27	.4	.07	.84	1.27	.06	.12
¼	.36	.54	.08	1.14	1.69	.1	.22
⅜	.49	.67	.09	1.55	2.12	.19	.35
½	.62	.84	.10	1.95	2.65	.3	.55
¾	.82	1.05	.11	2.58	3.29	.53	.86
1	1.04	1.31	.13	3.29	4.13	.86	1.35
1¼	1.38	1.66	.14	4.33	5.21	1.49	2.16
1½	1.61	1.9	.14	5.06	5.96	2.03	3.83
2	2.06	2.37	.15	6.49	7.46	3.35	4.43
2½	2.46	2.87	.20	7.75	9.03	4.78	6.49
3	3.06	3.5	.21	9.63	10.96	7.38	9.62
3½	3.56	4.	.22	11.14	12.56	9.83	12.56
4	4.02	4.5	.23	12.64	14.13	12.73	15.9
4½	4.5	5.	.24	14.15	15.7	15.93	19.63
5	5.04	5.56	.25	15.84	17.47	19.99	24.29
6	6.06	6.62	.28	19.05	20.81	28.88	34.47
7	7.02	7.62	.30	22.06	23.95	38.73	45.66
8	7.98	8.62	.32	25.07	27.09	50.03	58.42
9	9.	9.68	.34	28.27	30.43	63.63	73.71
10	10.01	10.75	.36	31.47	33.77	78.83	90.79
11	11.	11.75	.37	34.55	36.91	95.03	108.43
12	12.	12.75	.37	37.7	40.05	113.09	127.67

## Capacities and Threads of Standard W. I. Pipe

Nomi- nal Inside Diam. Inches	Length to Thread Inches	Length of Pipe Contain- ing one Gallon Feet	Con- tained Pounds of Water per Lineal Foot	Nomi- nal Inside Diam. Inches	Length to Thread Inches	Length of Pipe Contain- ing one Gallon Feet	Con- tained Pounds of Water per Lineal Foot
⅛	¾	336.6	.024	3½	1¼	1.95	4.285
¼	¾	148.8	.044	4	1½	1.51	5.517
⅜	1	100.8	.082	4½	1¾	1.2	6.908
½	1½	63.2	.132	5	1¾	.96	8.668
¾	1¾	36.1	.23	6	1¾	.66	12.521
1	2	22.3	.373	7	1½	.49	16.79
1¼	1½	12.8	.648	8	1¾	.38	21.688
1½	1¾	9.4	.883	9	1¾	.3	27.58
2	2	5.7	1.454	10	1¾	.24	34.171
2½	1	4.02	2.072	11		.2	41.189
3	1	2.6	3.202	12		.17	49.017

NOTE.—Above information is quoted from standard authorities, Not guaranteed.

# Heat Units and Weight of Water

Heat units in water, between 32 and 212 degrees Fahrenheit and weight of water per cubic foot.

Tem. Deg. Fahr.	Heat Units	Weight, lbs. per cub. ft.	Tem. Deg. Fahr.	Heat Units	Weight, lbs. per cub. ft.	Tem. Deg. Fahr.	Heat Units	Weight lbs. per cub. ft.
32	0.	62.42	123	91.16	61.68	168	136.44	60.81
35	3.	62.42	124	92.17	61.67	169	137.45	60.79
40	8.	62.42	125	93.17	61.65	170	138.45	60.77
45	13.	62.42	126	94.17	61.63	171	139.46	60.75
50	18.	62.41	127	95.18	61.61	172	140.47	60.73
52	20.	62.40	128	96.18	61.60	173	141.48	60.70
54	22.01	62.40	129	97.19	61.58	174	142.49	60.68
56	24.01	62.39	130	98.19	61.56	175	143.50	60.66
58	26.01	62.38	131	99.20	61.54	176	144.51	60.64
60	28.01	62.37	132	100.20	61.52	177	145.52	60.62
62	30.01	62.36	133	101.21	61.51	178	146.52	60.59
64	32.01	62.35	134	102.21	61.49	179	147.53	60.57
66	34.02	62.34	135	103.22	61.47	180	148.54	60.55
68	36.02	62.33	136	104.22	61.45	181	149.55	60.53
70	38.02	62.31	137	105.23	61.43	182	150.56	60.50
72	40.02	62.30	138	106.23	61.41	183	151.57	60.48
74	42.03	62.28	139	107.24	61.39	184	152.58	60.46
76	44.03	62.27	140	108.25	61.37	185	153.59	60.44
78	46.03	62.25	141	109.25	61.36	186	154.60	60.41
80	48.04	62.23	142	110.26	61.34	187	155.61	60.39
82	50.04	62.21	143	111.26	61.32	188	156.62	60.37
84	52.04	62.19	144	112.27	61.30	189	157.63	60.34
86	54.05	62.17	145	113.28	61.28	190	158.64	60.32
88	56.05	62.15	146	114.28	61.26	191	159.65	60.29
90	58.06	62.13	147	115.29	61.24	192	160.67	60.27
92	60.06	62.11	148	116.29	61.22	193	161.68	60.25
94	62.06	62.09	149	117.30	61.20	194	162.69	60.22
96	64.07	62.07	150	118.31	61.18	195	163.70	60.20
98	66.07	62.05	151	119.31	61.16	196	164.71	60.17
100	68.08	62.02	152	120.32	61.14	197	165.72	60.15
102	70.09	62.00	153	121.33	61.12	198	166.73	60.12
104	72.09	61.97	154	122.33	61.10	199	167.74	60.10
106	74.10	61.95	155	123.34	61.08	200	168.75	60.07
108	76.10	61.92	156	124.35	61.06	201	169.77	60.05
110	78.11	61.89	157	125.35	61.04	202	170.78	60.02
112	80.12	61.86	158	126.36	61.02	203	171.79	60.00
114	82.13	61.83	159	127.37	61.00	204	172.80	59.97
115	83.13	61.82	160	128.37	60.98	205	173.81	59.95
116	84.13	61.80	161	129.38	60.96	206	174.83	59.92
117	85.14	61.78	162	130.39	60.94	207	175.84	59.89
118	86.14	61.77	163	131.40	60.92	208	176.85	59.87
119	87.15	61.75	164	132.41	60.90	209	177.86	59.84
120	88.15	61.74	165	133.41	60.87	210	178.87	59.82
121	89.15	61.72	166	134.42	60.85	211	179.89	59.79
122	90.16	61.70	167	135.43	60.83	212	180.90	59.76

NOTE.—Above information is quoted from standard authorities. Not guaranteed.



# Table of Mains and Branches

Main	Branch
1 in. will supply	2 ..... $\frac{3}{4}$ in.
1 $\frac{1}{4}$ in. "	2 ..... 1 in.
1 $\frac{1}{2}$ in. "	2 ..... 1 $\frac{1}{4}$ in.
2 in. "	2 ..... 1 $\frac{1}{2}$ in.
2 $\frac{1}{2}$ in. "	2 1 $\frac{1}{2}$ in. and 1 1 $\frac{1}{4}$ in., or 1 2 in. and 1 1 $\frac{1}{4}$ in.
3 in. "	1 2 $\frac{1}{2}$ in. and 1 2 in., or 2 2 in. and 1 1 $\frac{1}{2}$ in.
3 $\frac{1}{2}$ in. "	2 2 $\frac{1}{2}$ in. or 1 3 in., and 1 2 in. or 3 2 in.
4 in. "	1 3 $\frac{1}{2}$ in. and 1 2 $\frac{1}{2}$ in., or 2 3 in. and 4 2 in.
4 $\frac{1}{2}$ in. "	1 3 $\frac{1}{2}$ in. and 1 3 in., or 1 4 in. and 1 2 $\frac{1}{2}$ in.
5 in. "	1 4 in. and 1 3 in., or 1 4 $\frac{1}{2}$ in. and 1 2 $\frac{1}{2}$ in.
6 in. "	2 4 in. and 1 3 in., or 4 3 in. or 10 2 in.
7 in. "	1 6 in. and 1 4 in., or 3 4 in. and 1 2 in.
8 in. "	2 6 in. and 1 5 in., or 5 4 in. and 2 2 in.

## Weights

One Cubic inch of Cast Iron,	weighs . . . . .	0.26 pounds.
One Cubic inch of Wrought Iron,	" . . . . .	0.28 "
One Cubic inch of Water,	" . . . . .	0.036 "
One U. S. Gallon,	" . . . . .	8.33 "
One Imperial Gallon,	" . . . . .	10.00 "
One U. S. Gallon,	equals . . . . .	231.00 cubic inches.
One Imperial Gallon,	" . . . . .	277.274 "
One Cubic foot of Water	" . . . . .	7.48 U.S. gallons.
One Pound of Steam,	" . . . . .	27.222 cubic feet.
One Pound of Air	" . . . . .	13.817 " "

## Measure of Surface

144 sq. inches	=	1 sq. foot
9 sq. feet	=	1 sq. yard.
30 $\frac{1}{4}$ sq. yards	=	1 sq. rod.
40 sq. rods	=	1 rood.
4 roods	=	1 acre.
10 sq. chains	=	1 acre.
640 acres	=	1 sq. mile.

## Measure of Solidity

1728 cu. inches	=	1 cubic foot.
27 cubic feet	=	1 cubic yard.

## Liquid Measure

4 gills	make	1 pint.
2 pints	"	1 quart.
4 quarts	"	1 gallon.
31 $\frac{1}{2}$ gallons	"	1 barrel.

## Boiling Points of Various Fluids

Water in Vacuum . . . . .	98°	Refined Petroleum . . . . .	316°
Water, Atmosp'c Pres. . . . .	212°	Turpentine . . . . .	315°
Alcohol . . . . .	173°	Sulphur . . . . .	570°
Sulphuric Acid . . . . .	240°	Linseed Oil. . . . .	597°

## Melting Points of Different Metals

Aluminum . . . . .	1400°	Iron (cast) . . . . .	2450°
Antimony . . . . .	810°	Iron (wrought) . . . . .	2912°
Bismuth . . . . .	476°	Lead . . . . .	608°
Brass . . . . .	1900°	Platinum . . . . .	3080°
Bronze . . . . .	1692°	Silver (pure) . . . . .	1873°
Copper . . . . .	1996°	Steel . . . . .	2500°
Glass . . . . .	2377°	Tin . . . . .	446°
Gold (pure) . . . . .	2590°	Zinc . . . . .	680°

NOTE.—Above information is quoted from standard authorities. Not guaranteed.

## Specific Heat of Bodies

Material	Specific Heat	Authority
Cast Iron . . . . .	.12983 . . . . .	Regnault
Wrought Iron . . . . .	.11379 . . . . .	"
Lime . . . . .	.09555 . . . . .	"
Copper . . . . .	.09515 . . . . .	"
Brass . . . . .	.09391 . . . . .	"
Silver . . . . .	.05701 . . . . .	"
Tin . . . . .	.05695 . . . . .	"
Mercury . . . . .	.03332 . . . . .	"
Gold . . . . .	.03244 . . . . .	"
Platina . . . . .	.03243 . . . . .	"
Lead . . . . .	.03140 . . . . .	"
Bismuth . . . . .	.03084 . . . . .	"
Nickel . . . . .	.1086 . . . . .	"
Ice . . . . .	.504 . . . . .	Person
Coal . . . . .	.2777 . . . . .	Crawford
Coke . . . . .	.20085 . . . . .	Regnault
Glass . . . . .	.19768 . . . . .	"
Burnt Clay . . . . .	.185 . . . . .	Gadolin
Brickwood . . . . .	.200 . . . . .	"
Water at 32 degrees . . . . .	1.000 . . . . .	
Alcohol (Sq. 793) . . . . .	.622 . . . . .	Dalton
Ether (Sulphuric) . . . . .	.477 .322 . . . . .	Regnault
Oil of Turpentine . . . . .	.472 . . . . .	Despretz
Petroleum . . . . .	.434 . . . . .	Regnault
Olive Oil . . . . .	.3096 . . . . .	Lavoisier
Air . . . . .	.237 . . . . .	

## Specific Gravity of Bodies

To find the weight of a body, determine its cubical contents and multiply its Specific Gravity by the weight of a like volume of water.

Body	Specific Gravity	Weight per cu. ft. in pounds
Water . . . . .	1.00	62.5
Aluminum . . . . .	2.50	156.3
Tin (cast) . . . . .	7.29	455.6
Steel . . . . .	7.84	490.0
Cast Iron . . . . .	7.21	450.6
Wrought Iron . . . . .	7.68	480.0
Brass . . . . .	8.38	523.8
Copper . . . . .	8.79	549.4
Lead (cast) . . . . .	11.35	709.4
Mercury . . . . .	13.60	850.0
Platinum . . . . .	21.50	1343.8

NOTE.—Above information is quoted from standard authorities. Not guaranteed.



# Heating and Evaporative Power of Coals

One cubic foot of hard coal weighs 50 lbs.

One cubic foot of soft coal weighs 40 lbs.

One cubic foot of coke weighs 28 lbs.

Heine's analysis shows the stated fuel values to run:

State	Brand	B. T. U., Per Lb.
Arkansas . . . . .	Coal Hill . . . . .	11,812
	Huntington Co. . . . .	12,537
Illinois . . . . .	Big Muddy . . . . .	11,494 avg.
	Carterville . . . . .	11,601 "
	Colchester . . . . .	9,848
	" Slack . . . . .	9,035
	Dunferline Slack . . . . .	9,401
	Duquoin . . . . .	10,710
	Glen Carbon . . . . .	9,740 avg.
	Girard . . . . .	10,111 "
	Heitz Bluff . . . . .	10,454 "
	Hurricane . . . . .	11,868
	Muddy Valley . . . . .	11,718
	Oakland . . . . .	10,395
	St. Clair . . . . .	10,068 avg.
Indiana . . . . .	St. John . . . . .	9,797 "
	Streator . . . . .	11,403
	Trenton . . . . .	10,584
	Turkey Hill . . . . .	11,255 avg.
	Vulcan . . . . .	9,450
	Block . . . . .	10,407
Indian Territory . . . . .	Atoka . . . . .	11,088
	Choctaw Nation . . . . .	12,789
	McAllister . . . . .	13,287
Iowa . . . . .	Milwaukee Pea . . . . .	10,240
	What Cheer . . . . .	8,702
Kentucky . . . . .	Kanawha . . . . .	13,345
Maryland . . . . .	George's C'k Cumberland . . . . .	13,700
Missouri . . . . .	Bevier . . . . .	9,890
	Elston . . . . .	12,656
	Lump . . . . .	9,414
New Mexico . . . . .	Coal . . . . .	11,756
Ohio . . . . .	Hocking Valley . . . . .	13,309
	Jackson Co. . . . .	11,600
	Clearfield . . . . .	14,000
Pennsylvania . . . . .	Youghiogeny . . . . .	13,480
	Pittsburg Slack . . . . .	11,739
	Glen Mary . . . . .	13,167
Tennessee . . . . .	Lump . . . . .	12,215
	Ft. Worth . . . . .	9,450
Texas . . . . .	" . . . . .	11,803
	Pocahontas . . . . .	13,363
Virginia . . . . .	Carbon Hill . . . . .	12,866
Washington . . . . .	New River . . . . .	13,374
West Virginia . . . . .	" . . . . .	12,800

# Chemical Composition of Combustibles

Peclet (Authority)

	Carbon	Hydrogen	Oxygen	Nitrogen & Sulphur	Water	Ash	Total
Alcohol .....	.5198	.137	.3432	.....	.....	.....	1.000
Beeswax .....	.816	.139	.045	.....	.....	.....	1.000
Coal (Average of 97 Varieties.. )	.804	.0519	.0787	.0246	.....	.0408	1.000
Coke .....	.850	.....	.....	.....	.....	.150	1.000
Oil of Turps .....	.884	.116	.....	.....	.....	.....	1.000
Olive Oil .....	.7721	.1336	.0943	.....	.....	.....	1.000
Paraffine Oil .....	.8522	.1478	.....	.....	.....	.....	1.000
Peat (Dry) .....	.580	.060	.310	.....	.....	.050	1.000
Peat (Charcoal) .....	.818	.....	.....	.....	.....	.182	1.000
Peat (Ordinary) .....	.464	.048	.248	.....	.200	.040	1.000
Resin .....	.7927	.1015	.1058	.....	.....	.....	1.000
Sperm Oil .....	.789	.1097	.1013	.....	.....	.....	1.000
Spermaceti .....	.816	.128	.056	.....	.....	.....	1.000
Sulphur Ether .....	.6531	.1333	.2136	.....	.....	.....	1.000
Tallow .....	.790	.117	.093	.....	.....	.....	1.000
Wood (Dry) .....	.510	.053	.417	.....	.....	.020	1.000
Wood (Ordinary) .....	.408	.042	.334	.....	.200	.016	1.000
Wood (Charcoal) .....	.930	.....	.....	.....	.....	.070	1.000

## Total Heat Evolved by Combustibles

And their Equivalent Evaporative Power with the weight of Oxygen and quantity of Air Chemically consumed

Combustibles	Weight of Oxygen per lb. of Combustibles	Quantity of Air per lb. of Combustibles		Total Heat per lb. Combustibles	Equivalent Evaporative Power 1 lb. Combustible (Atmospheric Pressure)
		Lb.	AIR Cubic Ft. at 60 deg.		
1 Lb. Weight	Lb.	Lb.	B. T. U.		Lbs. of Water from and at 212 degrees
Hydrogen .....	8.00	34.8	457	62032	64.2
C to CO .....	1.33	5.8	76	4452	4.61
C to CO <sup>2</sup> .....	2.66	11.6	152	14500	15.0
CO to CO <sup>2</sup> .....	.57	2.48	33	4325	4.48
CH <sup>4</sup> (Coal Gas)....	4.	17.4	229	23513	24.34
C <sup>2</sup> H <sup>2</sup> (Olefiant)...	3.43	15.0	196	21343	22.09
Sulphur .....	1.00	4.35	57	4032	4.17
Average Coal .....	2.46	10.7	140	14133	14.62
Coke (desiccated)...	2.50	10.9	143	13550	14.02
Wood .....	1.40	6.1	80	7792	8.07
Peat .....	1.75	7.6	100	9951	10.30
Lignite .....	2.03	8.85	116	11678	12.10
Asphalt .....	2.73	11.87	156	16655	17.24
Straw (15% H <sup>2</sup> -O)..	.98	4.26	56	5196	5.56
Petroleum .....	4.12	17.93	235	27531	28.50

NOTE.—Above information is quoted from standard authorities. Not guaranteed.

# Chimney Flues

The selection of chimney flues for Heating Boilers must depend upon the judgment of the Heating Engineer. No tabular statements can be guaranteed, but it is believed that the table herewith, of Prof. R. C. Carpenter, when used in connection with the size of smoke pipes given for each IDEAL Boiler, will very much assist the engineer in selecting flues.

It is necessary that area and HEIGHT, thickness of walls, general structure, and the position of the top outlet with reference to the building and other buildings near by, should be carefully noted and observed in selecting or building a flue.

The figures given under the varying heights of chimneys are diameter measurements in inches, or, the side of a square—the theory being that the spiral ascending column of smoke and gases will make a twelve by twelve inch flue no more extensive in practical working area than a twelve inch round flue. Rectangular shapes may be used if the area is equal and the difference in width and length are not extreme.

DIRECT RADIATION *		HEIGHT OF CHIMNEY FLUE					
Steam in Square Feet	Water in Square Feet	20 ft.	30 ft.	40 ft.	50 ft.	60 ft.	80 ft.
250	375	7.4	7.	6.7	6.4	6.2	6.
500	750	9.6	9.2	8.8	8.2	8.	6.6
750	1150	11.3	10.8	10.2	9.6	9.3	8.8
1000	1500	12.8	12.	11.4	10.8	10.5	10.
1500	2250	15.2	14.4	13.4	12.8	12.4	11.5
2000	3000	17.2	16.3	15.2	14.5	14.	13.2
3000	4500	20.6	18.5	18.2	17.2	16.6	15.8
4000	6000	23.6	22.2	20.8	19.6	19.	17.8
5000	7500	26.	24.6	23.	21.6	21.	19.4
6000	9000	28.4	26.8	25.	23.4	22.8	21.2
7000	10500	30.4	28.8	27.	25.5	24.4	23.
8000	12000	32.4	30.6	28.6	26.8	26.	24.2
9000	13500	34.	32.4	30.4	28.4	27.4	25.6
10000	15000	37.	34.	32.	30.	28.6	27.

\* NOTE.—When a considerable amount of INDIRECT radiation is to be used, increased Boiler capacity is necessary, and in many cases such demands require a larger chimney flue for same number of square feet of radiation used.

## A Less Specific Rule for Chimney Flues

Herewith is a table of chimney flue sizes which is commonly used with good results. It does not take into consideration varying heights of stacks, but is said to be reliable in average conditions.

DIRECT RADIATION *		SIZE OF FLUE	
Steam in Square Feet	Water in Square Feet	Round	Square
250	400	8	8 x 8
300	500	8	8 x 8
400	700	8	8 x 8
500	850	10	8 x 12
600	1000	10	8 x 12
700	1200	10	8 x 12
800	1350	12	12 x 12
900	1500	12	12 x 12
1000	1700	12	12 x 12
1200	2100	12	12 x 12
1400	2400	14	12 x 16
1600	2700	14	12 x 16
1800	3000	14	12 x 16
2000	3400	14	12 x 16
2200	3700	16	16 x 16
3000	5100	16	16 x 16
3500	5900	18	16 x 20
5000	8500	18	16 x 20

\* NOTE.—When a considerable amount of INDIRECT radiation is to be used, increased Boiler capacity is necessary and in many cases such demands require a larger chimney flue for same number of square feet of radiation used.



## The Ordinary Chimney Flue

The area of the flue should never be less than 9 or 10 inches round, or 8x12 rectangular—unless for a very small heating boiler or tank heater, when an 8-inch round or 8x8 square flue will answer, if high enough. The flue should have a little more area than that of the smoke-pipe. There is less friction in a round-tile flue than in the square form, for the spiral ascent of the draft moves in the easiest manner.

The value of the flue depends on volume of passage due to area, and velocity due to height. Velocity alone is no proof of good draft—there must be also sufficient area to carry the smoke.

The chimney-top should run above the highest part of the roof, and should be so located with reference to any higher buildings near by that wind-currents will not form eddies and force the air downward in the shaft. A shifting cowl which will always turn the outlet away from the adverse currents will promote better draft.

The flue should run as nearly straight up from the base to the top outlet as possible. It should have no other openings into it but the boiler smoke-pipe. Sharp bends and offsets in the flue will often reduce the area and choke the draft. The flue must be free of any feature which prevents a free area for the passage of smoke. The outlet must not be capped so that the area of the outlet is less than the area of the flue.

If the flue is made of round tile the joints must be tightly cemented, or all space between the tile and brick-work filled in tightly. There must be no open crevices into the flue where the sections lap—otherwise the draft is checked.

If the flue is made of brick only, the stack should be at least two four-inch courses in thickness. The inside should be smooth.

If there is a soot-pocket in the flue below the smoke-pipe opening, the clean-out door should always be closed. If this soot-pocket has other openings in it—from fire-places or other connections—they check the draft and prevent best action in the Boiler.

The smoke-pipe should not extend into the flue beyond the inside surface of the flue, otherwise the end of the pipe cuts down the area of the flue and injures its drawing capacity. The joints, where the smoke-pipe fits the smoke-hood of the Boiler, or where the pipe enters the chimney, should be made tight with boiler putty or asbestos cement.

# Siphon Pressure Draft Gauge

Height Water Inches	Pres- sure per Lb.	Velocity Feet per Sec.	Velocity Feet per Min.	Height Water Inches	Pres- sure per Lb.	Velocity Feet per Sec.	Velocity Feet per Min.
.1	.521	15.05	903	1.1	5.731	49.9	2994
.2	1.042	21.3	1278	1.2	6.252	52.1	3126
.3	1.563	26.06	1564	1.3	6.773	54.2	3252
.4	2.084	30.1	1806	1.4	7.294	56.3	3378
.5	2.605	33.6	2016	1.5	7.815	58.2	3492
.6	3.126	36.8	2208	1.6	8.336	60.2	3612
.7	3.647	39.8	2388	1.7	8.857	62	3720
.8	4.168	42.5	2550	1.8	9.378	63.8	3828
.9	4.689	45.1	2706	1.9	9.899	65.6	3936
1.0	5.210	47.5	2850	2.	10.420	67.3	4038

## Data Relating to Ventilation

Loss of heat caused by—

*First.* B. T. U. necessary to warm air.

*Second.* B. T. U. absorbed by walls.

*Third.* B. T. U. absorbed by ceiling.

*Fourth.* B. T. U. absorbed by floor.

*Fifth.* B. T. U. absorbed by windows.

Sources of heat in rooms (Schuman, authority):—

*First.* B. T. U. generated by occupants.

*Second.* B. T. U. generated by gas, lamps or candles.

*Third.* B. T. U. generated by heating apparatus.

An adult requires each hour for respiration and transpiration 215 cubic feet or  $215 \times .077 = 165$  pounds, and generates 290 B. T. U. of which 99 units are in form of vapor and 191 units radiate to surrounding objects.

### Approximate

An adult requires not less than 1800 cubic feet of air per hour.

Each cubic ft. gas burned requires 8.5 cu. ft. air.

Each lb. oil burned requires 150 cu. ft. air.

Each lb. candles burned requires 160 cu. ft. air.

B. T. U. generated by an adult per hour, 191.

B. T. U. generated by burning 1 cu. ft. gas, 600.

B. T. U. generated by burning 1 lb. oil or candles, 15,000 to 18,000.

Average gas burner consumes approximately 4 cu. ft. gas per hour, which equals 2400 B. T. U. per hour.

The average flame from oil lamp 430 to 515 B. T. U. per hour.

The average candle 454 to 545 B. T. U. per hour.

NOTE—Above information is quoted from standard authorities. Not guaranteed.



# Specifications of Massachusetts District Police, for Heating and Ventilating Public Buildings, Schools, Etc.

(Form No. 83)

1. That the apparatus will, with proper management, heat all the rooms including corridors to 70° in any weather.
2. That with the rooms at 70° and a difference of not less than 40° between the temperature of the outside air and that of the air entering the room at the warm air inlet, the apparatus will supply at least thirty cubic feet of air per minute for each scholar accommodated in the rooms.
3. That such supply of air will so circulate in the rooms that no uncomfortable draught will be felt, and that the difference in temperature between any two points on the breathing plane (5 ft.) in the occupied portion of a room will not exceed 3°.
4. That vitiated air in amount equal to supply from inlets will be removed through the vent ducts.

## Colors to be used in Heating Plans

There is a general understanding among European heating engineers as to which colors to use on plans to indicate the meaning or use of the different lines, as per the schedule below.

### Air

Fresh cold air . . . . .	Light Green
Fresh warmed air (warm air chambers) . . . . .	Carmine
Mixed air (warm and cold) . . . . .	Yellow
Vitiated air (ventilating flues) . . . . .	Blue
Circulating or reheated air . . . . .	Violet
Cross sections in dark tones, vertical sections in lighter tones.	

### Constructive Parts

All iron parts, such as boilers, doors, stairs, engines, blowers, damper, chains, registers, heating pipes, traps, expansion tanks, etc. . . . .		Blue lines
Steam radiators . . . . .	Blue edge filled with	Green
Water radiators . . . . .	Blue edge filled with	Blue
Direct indirect radiators . . . . .	Blue edge filled with	Yellow
Low pressure steam pipes . . . . .		Orange
High pressure steam pipes . . . . .		Carmine
Return steam pipes . . . . .		Dark Green
Hot water flow pipes . . . . .		Sienna
Hot water return pipes . . . . .		Blue
Air vent pipes . . . . .		Blue
Cold water supply pipes . . . . .		Violet
Overflow pipes . . . . .		Brown



# Telegraph Code

In writing a cipher message, please observe the following: First—Begin every cipher word with a *capital* letter. Second—Whenever a blank occurs in a sentence, the word or words supplying such blank must immediately follow the cipher word of the sentence.

## Quotations and Correspondence

	Cipher Word
At what price and how soon can you furnish..	Quadrants
Quote best price on.....	Quadrate
Quote best price on....square feet of standard (38-inch height) height of....	Radiators....
Wire reply quickly .....	Quadrille
Will wire you tomorrow morning .....	Quadroon
Have written.....	Quaffed
Answer by first mail.....	Quaggy
See our letter of....giving full particulars....	Quagmire
Have received no reply from you to our letter of.	Quaintly
Referring to your telegram of.....	Quakingly
Referring to your letter of.....	Quakerism
Referring to our telegram of.....	Qualify
Referring to our letter of.....	Quandary
Referring to telephone conversation of today.	Quarried
Do not understand the meaning of.....	Queerness
Inclosure mentioned in your letter of....not received, mail same at once.....	Quantette
We quote you for immediate acceptance.....	Quantum
F. O. B. factory and less the carload rate of freight to.....	Quash
F. O. B. factory and less carload rate of freight where same does not exceed fifteen cts. per hundred lbs.....	Quaternion
What is the carload freight rate to.....	Quatrains
What is less than carload freight rate to.....	Quavered
Best rate of freight quoted on carload is.....	Quench
Best rate of freight quoted on less than car load is	Querist
Will wire you freight rates soon as received...	Quibbler
Change my route to read as follows .....	Quietude
	Questabor

## Orders and Shipments

Ship immediately .....	Obdurate
Ship by express.....	Obedient
Ship by express, prepaid.....	Oxalicston
Ship by freight .....	Obeisance
Ship by best route .....	Obelisk
Ship by boat .....	Obesity

# Telegraph Code—Continued

## Orders and Shipments—Continued

	Cipher Word
Ship immediately and follow with tracer .....	Objective
Ship immediately and follow with tracer (our order No.....)	Objector
Ship before present freight rates advance.....	Objurgate
Ship with draft and bill of lading attached ....	Oblate
Ship in first car to.....	Obquitate
Send us bill of lading covering our order (No....)	Obliquity
Enter order as per our inquiry of.....	Oblivion
Enter order at your quotation of.....	Obscurity
Include in car now assembling at ....plant....	Obsequious
Ship by same route as our order (No. or date)	Observant
Will send shipping instructions by mail.....	Observer
Shipping instructions for order (No. or date) are.	Obstacle
Ship what you can at once .....	Obstinacy
Can't ship as ordered, but could ship today...	Obstruent
Do not hold for other orders, but rush quickly.	Obtruder
Send as small lot, unless car going at once....	Obtrusive
When can you make shipment?.....	Obviously
Could you ship immediately?.....	Obvolute
When will order (No. or date) be shipped ....	Opaque
When and by what route did you ship our order	Operas
Send tracer after our order (No. or date) .....	Operatics
Trace vigorously by wire our order (No. and date)	Ophidian
Add to our order (No. or date) .....	Opiate
Duplicate our order (No. or date).....	Opium
You may substitute on our order (No. or date)	Opossum
Omit....from our order (No. or date).....	Opposer
Hold for instruction order (No. or date) .....	Oppressor
Could ship immediately .....	Optative
Expect to make shipment .....	Optical
Your order (No. or date) was shipped .....	Optician
Give date or number of order referred to .....	Optimism
Order No.....is ready for shipment. We have no car going for....days. Shall we forward as small lot? If so, wire shipping instructions	Ophthalmy
Order No....has not yet been shipped .....	Ophusing
Order No....has been preferred for shipment..	Oquarious
Advise by wire best shipping date.....	Oriskany
Please reply at once to our telegram.....	Orinktum
Prefer and rush order No.....	Oristatin
Can ship complete your No.....immediately except ... Shall we make such shipment ...	Orrostile
Make proposed shipment order No.....without waiting for .....	Orstingle



# Telegraph Code—Continued

## Orders and Shipments—Continued

	Cipher Word
Your order (No. or date) does not specify . . . .	Opulent
Change our order (No. or date) to read . . . . .	Oracular
Referring to your order (No. or date) . . . . .	Orators
Referring to our order (No. or date) . . . . .	Orchards
Do not find any order from you (No. or date) ..	Orchestra

## Table of Dates

In telegraphing dates, prefix the day of the month. For example: "Aronsberg" would mean "first day of January."

Date	Cipher Word	Date	Cipher Word
1st . . . . .	Arons	17th . . . . .	Elgin
2d . . . . .	Arch	18th . . . . .	Eaton
3d . . . . .	Abbey	19th . . . . .	Front
4th . . . . .	Baron	20th . . . . .	Glass
5th . . . . .	Butch	21st . . . . .	Grass
6th . . . . .	Blake	22d . . . . .	Hazel
7th . . . . .	Bulls	23d . . . . .	Lees
8th . . . . .	Barro	24th . . . . .	Lynx
9th . . . . .	Chink	25th . . . . .	Olden
10th . . . . .	Clegg	26th . . . . .	Oster
11th . . . . .	Cake	27th . . . . .	Pilot
12th . . . . .	Cole	28th . . . . .	Plump
13th . . . . .	Dress	29th . . . . .	Queer
14th . . . . .	Devon	30th . . . . .	Race
15th . . . . .	Dunn	31st . . . . .	Skunk
16th . . . . .	Elsie		

NOTE: Adding "morn" or "aft" to any of above code words will signify morning or afternoon of any of the dates given. Thus: "Barro-morn" will be understood as "the morning of the 8th"; "Oldenaft" will signify "the afternoon of the 25th," and so on.

Month	Cipher Word	Month	Cipher Word
January . . . . .	Berg	July . . . . .	Ham
February . . . . .	Boro	August . . . . .	Mont
March . . . . .	Dorf	September . . . . .	Soire
April . . . . .	Dale	October . . . . .	Ton
May . . . . .	Field	November . . . . .	Ville
June . . . . .	Ford	December . . . . .	Wood

## Time

	Cipher Word		Cipher Word
1 day . . . . .	Apple	2 weeks . . . . .	Lemon
2 days . . . . .	Apricot	3 weeks . . . . .	Olives
3 days . . . . .	Banana	1 month . . . . .	Orange
4 days . . . . .	Cherry	2 months . . . . .	Peach
5 days . . . . .	Citron	3 months . . . . .	Pears
6 days . . . . .	Dates	4 months . . . . .	Plum
10 days . . . . .	Figs	5 months . . . . .	Quince
1 week . . . . .	Grape	6 months . . . . .	Tomatoes



# Telegraph Code—Continued

## Numerals

These figures may be used in giving quantities, order numbers, amounts in dollars, weights, car numbers, etc.

To make up a word above 99, use the code as follows: For example, 142—14 cet, 2 bef—"cetbef." Or, 1425—14 cet, 25 dlo—"cetdlo." Or, 14,254—14 cet, 25 dlo, 4 bot—"cetdlobot." Or, 142,547—14 cet, 25 dlo, 47 fod—"cetdlofod."

Or, say, car number 100,009—10 cul, 00 ayd, 09 abu—"culaydabu."

Cipher Word		Cipher Word		Cipher Word	
0	Aeb	27	Dim	64	Hic
00	Ayd	28	Dys	65	Hob
01	Aux	29	Dni	66	Hue
02	Arg	30	Eic	67	Hey
03	Ame	31	Eat	68	Hak
04	Ano	32	Eub	69	Hyk
05	Aup	33	Ewe	70	Jim
06	Ado	34	Ens	71	Jut
07	Alm	35	Ebi	72	Jix
08	Ast	36	Ext	73	Jeb
09	Abu	37	Esi	74	Jyc
1	Buc	38	Efa	75	Jri
2	Bef	39	Emp	76	Jos
3	Bix	40	Fax	77	Jlo
4	Bot	41	Fit	78	Jak
5	Bal	42	Fub	79	Jab
6	Blu	43	Feg	80	Lin
7	Bri	44	Fri	81	Lam
8	Bum	45	Flo	82	Lux
9	Boj	46	Fys	83	Loy
10	Cul	47	Fod	84	Lek
11	Clu	48	Fam	85	Lud
12	Cam	49	Fik	86	Lyt
13	Cro	50	Gal	87	Loe
14	Cet	51	Gig	88	Lij
15	Cug	52	Gub	89	Lub
16	Cat	53	Ger	90	Mum
17	Cle	54	Gof	91	Mib
18	Cok	55	Gri	92	Mez
19	Cwo	56	Glu	93	Myt
20	Dam	57	Gyt	94	Max
21	Dri	58	Gum	95	Mok
22	Dup	59	Gnu	96	Muj
23	Det	60	Hyx	97	Mil
24	Dix	61	Hab	98	Mac
25	Dlo	62	Hel	99	Mep
26	Dox	63	Hum		

# Telegraph Code—Continued

## Inches

Inches	Cipher Word	Inches	Cipher Word
$\frac{1}{8}$ .....	Inattentive	3 .....	Irradiate
$\frac{1}{4}$ .....	Inactive	$3\frac{1}{2}$ .....	Irrigate
$\frac{3}{8}$ .....	Inability	4 .....	Irruption
$\frac{1}{2}$ .....	Inaction	$4\frac{1}{2}$ .....	Irritant
$\frac{3}{4}$ .....	Inanity	5 .....	Islands
1 .....	Inaudible	$5\frac{1}{2}$ .....	Isomeric
$1\frac{1}{4}$ .....	Inbreeds	6 .....	Isolated
$1\frac{1}{2}$ .....	Incarnate	7 .....	Isthmus
2 .....	Irksome	8 .....	Itinerant
$2\frac{1}{2}$ .....	Ironical		

## Quantity

	Cipher Word		Cipher Word
200 sq. ft. ....	Arabic	3,500 sq. ft. ....	Armorial
300 sq. ft. ....	Arbiter	4,000 sq. ft. ....	Armpit
400 sq. ft. ....	Arboret	5,000 sq. ft. ....	Aromatics
500 sq. ft. ....	Arcade	6,000 sq. ft. ....	Arpeggio
600 sq. ft. ....	Arcanum	7,000 sq. ft. ....	Arquebuse
700 sq. ft. ....	Archery	8,000 sq. ft. ....	Arrayed
800 sq. ft. ....	Ardency	9,000 sq. ft. ....	Arrogant
900 sq. ft. ....	Arena	10,000 sq. ft. ....	Arrow
1,000 sq. ft. ....	Argentine	12,000 sq. ft. ....	Arsenical
1,200 sq. ft. ....	Argosy	15,000 sq. ft. ....	Arterial
1,500 sq. ft. ....	Aridity	20,000 sq. ft. ....	Artichoke
1,800 sq. ft. ....	Armada	25,000 sq. ft. ....	Articulate
2,000 sq. ft. ....	Armature	30,000 sq. ft. ....	Artificer
2,500 sq. ft. ....	Arminian	40,000 sq. ft. ....	Artillery
3,000 sq. ft. ....	Armistice	50,000 sq. ft. ....	Artisan

## Heights

	Cipher Word		Cipher Word
13 -inch Ht. ....	Headland	26 -inch Ht. ...	Heptagon
14 -inch Ht. ....	Hearken	$27\frac{1}{2}$ -inch Ht. ...	Heptarchy
15 -inch Ht. ....	Heartless	28 -inch Ht. ...	Heptachord
16 -inch Ht. ....	Heather	30 -inch Ht. ...	Herbage
18 -inch Ht. ....	Heedful	31 -inch Ht. ...	Heretic
19 -inch Ht. ....	Heiress	32 -inch Ht. ...	Heritage
20 -inch Ht. ....	Helmet	33 -inch Ht. ...	Heritable
$21\frac{1}{2}$ -inch Ht. ....	Helmsman	$33\frac{1}{2}$ -inch Ht. ...	Hermetic
22 -inch Ht. ....	Helpmate	38 -inch Ht. ...	Heroic
23 -inch Ht. ....	Hemlock	$39\frac{1}{2}$ -inch Ht. ...	Hesperian
24 -inch Ht. ....	Hempen	44 -inch Ht. ...	Hessian
25 -inch Ht. ....	Henchman	45 -inch Ht. ...	Heterodox

# Telegraph Code—Continued

## Number of Sections

	Cipher Word		Cipher Word
2 Sections.....	Shackles	19 Sections.....	Sherry
3 Sections.....	Shadowy	20 Sections.....	Shielding
4 Sections.....	Shaggy	21 Sections.....	Shiftless
5 Sections.....	Shakerism	22 Sections.....	Shingles
6 Sections.....	Shallow	23 Sections.....	Shining
7 Sections.....	Shambles	24 Sections.....	Shipwreck
8 Sections.....	Shamrock	25 Sections.....	Shirkful
9 Sections.....	Sharpness	26 Sections.....	Shivering
10 Sections.....	Shattered	27 Sections.....	Shocking
11 Sections.....	Sheathe	28 Sections.....	Shoddy
12 Sections.....	Sheepfold	29 Sections.....	Shoggle
13 Sections.....	Sheepish	30 Sections.....	Shopworn
14 Sections.....	Shekel	31 Sections.....	Shopping
15 Sections.....	Shellac	32 Sections.....	Shoulder
16 Sections.....	Shepherd	33 Sections.....	Shouting
17 Sections.....	Sherbet	34 Sections.....	Shoveling
18 Sections.....	Sheridan	35 Sections.....	Showery
Supply Steam leg section for single pipe.....	Showman		
Supply Steam leg section for double pipe.....	Shredded		
Supply Steam leg section with both supply and return at bottom.....	Shrewish		
Supply Hot-Water leg section.....	Shrieked		
Blank leg section, Steam.....	Shrillness		
Return Steam leg section.....	Shrinkage		
Return Hot-Water leg section.....	Shrivel		
Intermediate Steam section.....	Shrubbery		
Intermediate Hot-Water section.....	Shunning		
Middle Steam leg section.....	Shuttle		
Intermediate Hot-Water leg section.....	Shyness		
Blank leg section.....	Shynonter		
Center leg section.....	Shymight		
Loop.....	Shymonge		
Drip leg section.....	Shysomer		

## Tapping Instructions

	Cipher Word		Cipher Word
$\frac{3}{4}$ -in. single pipe.....	Tablature	$1\frac{1}{2}$ x 1-in.....	Talmud
$\frac{3}{4}$ x $\frac{3}{4}$ -in.....	Tableau	$1\frac{1}{2}$ x $1\frac{1}{4}$ -in.....	Tamarind
1-in. single pipe...	Taffeta	$1\frac{1}{2}$ x $1\frac{1}{2}$ -in.....	Tandems
1 x $\frac{3}{4}$ -in.....	Tactiturn	2-in. single pipe...	Tannery
1 x 1-in.....	Tactician	2 x $1\frac{1}{2}$ -in.....	Tangling
$1\frac{1}{4}$ -in. single pipe.....	Talisman	Tapped at "A"...	Tantalize
$1\frac{1}{4}$ x $\frac{3}{4}$ -in.....	Taffrail	Tapped at "B"...	Tapestry
$1\frac{1}{4}$ x 1-in.....	Taintless	Tapped at "C"...	Tapioca
$1\frac{1}{4}$ x $1\frac{1}{4}$ -in.....	Tailorress	Tapped at "D"...	Tarpaulin
$1\frac{1}{2}$ -in. single pipe.....	Tangency		



# Telegraph Code—Continued

## Tapping Instructions—Continued

	Cipher Word
Tapped at "E" .....	Tartaric
Tapped at "F" .....	Tautology
Tapped at "G" .....	Taxidermy
Tapped at "H" .....	Tiara
Tapped right-hand.....	Tibial
Tapped left-hand.....	Ticklish
Tapped for single pipe Steam as per list.....	Tidiness
Tapped for double pipe Steam as per list.....	Tidology
Tapped for top supply and bottom return on same end.....	Tillage
Tapped for top supply and bottom return on opposite ends.....	Timbrel
Tapped for both supply and return tapplings at bottom of same end.....	Timidity
Tapped at extreme top of first section.....	Timorous
Tapped at extreme top of second section.....	Tincture
Tapped under radiator, bottom of first section..	Tinkling
Tapped under radiator, bottom of second section.	Tinseled
Tapped for ¼-inch air valves.....	Tipstaff
To have flush bushings.....	Tirade
To have eccentric bushings.....	Titanic
All to have detachable high legs, so that the distance from floor to center of supply tapping shall be....inches.....	Titmouse
All to have extra-high solid legs, so that the distance from floor to center of supply tapping shall be....inches.....	Titular
Insert blind nipple at top between loop and return leg section.....	Timiolas
Outside thread to be left-handed.....	Timist

## Style and Kind of Radiators

	Cipher Word
Ætna Flue Steam.....	Bachelor
Ætna Flue Water.....	Babyhood
Areal Sanitary Box-base No. 10 for Steam.....	Babblement
" " " " 15 for " .....	Babbling
Astro Two-Column Steam .....	Babington
" " Water.....	Babillard
Cardinal Indirect .....	Balloon
Circular for Water .....	Balmify
" Steam .....	Balneal

# Telegraph Code—Continued

## Style and Kind of Radiators—Continued

			Cipher Word
Colonial Wall, 5-ft., Vertical,	Steam	.....	Balloting
“ “ 5-ft., “	Water	.....	Balsams
“ “ 5-ft., Horizontal,	Steam	.....	Balsamic
“ “ 5-ft., “	Water	.....	Baluster
“ “ 7-ft., Vertical,	Steam	.....	Balustrade
“ “ 7-ft., Vertical,	Water	.....	Bamboos
“ “ 7-ft., Horizontal,	Steam	.....	Bamboozle
“ “ 7-ft., “	Water	.....	Banished
“ “ 9-ft., Vertical,	Steam	.....	Banality
“ “ 9-ft., “	Water	.....	Bandelet
“ “ 9-ft., Horizontal,	Steam	.....	Bandfish
“ “ 9-ft., “	Water	.....	Bandicoot
Corner for	Water	.....	Bandage
“	Steam	.....	Bandala
Curved for	Water	.....	Bandbox
“	Steam	.....	Bandeau
Dining Room	Water	.....	Banduty
“ “	Steam	.....	Barfeeny
Direct-Indirect for	Water	.....	Barbule
“ “	Steam	.....	Bardish
Excelsior Indirect	Water	.....	Barilla
“ “	Steam	.....	Barkery
“ Junior Indirect	Steam	.....	Barmaid
Italian Ornamental Flue Box-base	Water	.....	Barrage
“ “ “	Steam	.....	Barrier
“ “ “	Water	.....	Bartery
“ “ “	Steam	.....	Barwood
National Two-Column Direct-Indirect	Water	..	Barytes
“ “ “	Steam	..	Bascule
“ “	Water	.....	Bashful
“ “	Steam	.....	Basilar
“ Single-Column	Water	.....	Batatas
“ “	Steam	.....	Bateful
Peerless “	Water	.....	Battalia
“ “	Steam	.....	Baubles
“ Two-Column	Water	.....	Batting
“ “	Steam	.....	Battled
“ Three-Column	Water	.....	Battuta
“ “	Steam	.....	Batture
“ Four-Column	Steam	.....	Bavaroy
“ “	Water	.....	Baybolt
Perfection Ornamental Direct-Indirect	Steam	.....	Beamily
“ “ “	Water	....	Beached
“ “	Steam	.....	Bearing
“ “	Water	.....	Beardie
Perfection Plain	Steam	.....	Beastly
“ Pin Indirect, ex. lge., bolt and flge.			Beatify
Perfection Pin Indirect, stand., bolt and flge.			Beating



# Telegraph Code—Continued

## Style and Kind of Radiators—Continued

Cipher Word

Perfection Pin Indirect, extra large, with right and left-hand threaded nipple connections...	Beauish
Perfection Pin Indirect, standard size, with right and left-hand threaded nipple connections...	Becloud
Primus Indirect.....	Bedagat
Rococo Ornamental Direct-Indirect Steam...	Bedwarf
“ “ “ Water...	Bedroom
Rococo Ornamental Single-Column Steam...	Beaheart
“ “ “ Water...	Beehardy
“ “ Two-Column Steam...	Beeyorke
“ “ “ Water...	Beaminx
Rococo Plain Three-Column Steam.....	Belcher
“ “ “ “ Water, with right and left-hand threaded nipple connections...	Beeswax
Rococo Ornamental Three-Column Steam, right and left-hand threaded nipples.....	Behemoth
Rococo Ornamental Water, with right and left-hand threaded nipple connections.....	Beehive
Rococo Ornamental Three-Column Steam, with right-hand threaded nipples.....	Beldame
Rococo Ornamental Three-Column Water, with slip nipples.....	Beggary
Rococo Ornamental Four-Column Steam.....	Benirthe
“ “ “ “ Water.....	Benoylie
Rococo Box-Base Water.....	Benustume
“ “ “ Steam.....	Benortile
“ Window, Steam.....	Belcrack
“ “ Water.....	Beldregg
“ Wall, 5-ft., Vertical, Steam.....	Bolamtere
“ “ 5-ft., “ Water.....	Bolshuter
“ “ 5-ft., Horizontal Steam.....	Bolstamp
“ “ 5-ft., “ Water.....	Bolseeping
“ “ 7-ft., Vertical, Steam.....	Bolsistos
“ “ 7-ft., “ Water.....	Bolsaxtun
“ “ 7-ft., Horizontal Steam.....	Bolpriter
“ “ 7-ft., “ Water.....	Bolfriste
“ “ 9-ft., Vertical, Steam.....	Bolfamost
“ “ 9-ft., “ Water.....	Bolfrinot
“ “ 9-ft., Horizontal Steam.....	Bolfuxtus
“ “ 9-ft., “ Water.....	Bolgrater
Sanitary School Pin Indirect, Steam.....	Beleaguer
“ “ “ “ Water.....	Beloxide
Stairway for Steam.....	Believer
Standard Pin Indirect, 12 sq. ft. per sec., Steam	Beloved
“ “ “ 12 sq. ft. “ Water	Belting
“ “ “ 15 sq. ft. “ Steam	Bending
“ “ “ 15 sq. ft. “ Water	Beneath
Sterling Indirect.....	Benefit

# Telegraph Code—Continued

## Style and Kind of Radiators—Continued

Vento Blast Heater, 40-inch section .....	Cipher Word
“ “ “ 50-inch “ .....	Bergamont
“ “ “ 60-inch “ .....	Berbriney
Verona Steam .....	Bergomask
Verona Water .....	Bidental
Window Radiators for Steam .....	Bicycle
“ “ “ Water .....	Bigoted
Zenith Flue Steam .....	Bifilar
“ “ Water .....	Biliary
“ “ Box-base Steam .....	Bilious
“ “ “ Water .....	Billiards
“ Window Steam .....	Billowy
“ “ Water .....	Biotaxy
	Bipolar

## Radiator Miscellanies

	Cipher Word
Box-Base with back opening, Detroit Plant....	Machinate
“ “ bottom “ “ “ .....	Madrigal
“ “ back “ Titusville “ .....	Madcaps
“ “ bottom “ “ “ .....	Macrology
“ New Adjustable, back opening.....	Macromger
“ “ “ bottom “ .....	Macstought
Brackets, No. J .....	Macerated
“ No. K .....	Macrotous
“ No. L .....	Magically
“ No. M .....	Magistracy
“ No. N .....	Magisterial
“ No. O .....	Magnesium
“ No. P .....	Magpolard
Bushings, 2 inches, reducing to 1½ inches....	Magnate
“ 2 “ “ 1¼ “ .....	Magnetic
“ 2 “ “ 1 inch .....	Magnolia
“ 2 “ “ ¾ “ .....	Mahogany
“ 1½ “ “ 1¼ “ .....	Magnific
“ 1½ “ “ 1 “ .....	Magnify
“ 1½ “ “ ¾ “ .....	Magnitude
“ 1½ “ “ ½ “ .....	Magpie
“ Flush .....	Mahometan
“ Eccentric .....	Majestic
Carpet Feet, arranged with detachable.....	Malapert
Dampers, Floor.....	Malicious
Legs, fitted with Detachable high; to make distance, floor to center supply tapping... inches	Malster
Legs, extra high solid; to make distance from floor to center of supply.... inches.....	Mammal
Legs, fitted with detachable Carpet (legs or feet)	Mammoth
Nipples, 2 -inch right and left-hand threaded..	Manacle
“ 1½-inch “ “ “ “ .....	Mandarin
Nipples, 2-inch right- and left-hand threaded with hexagon nut at center.....	Mandatory

# Telegraph Code—Continued

## Radiator Miscellanies—Continued

	Cipher Word
Nipples, 2-inch right-hand threaded .....	Manhood
“ 2¼-inch slip .....	Manifesto
Pedestals....inches high .....	Manifold
Pedestals to make distance from floor to center of supply tapping....inches .....	Mankind
Plugs, 2-inch .....	Mannerism
“ 1½-inch .....	Manœuvre
“ ⅛-inch Brass (for air valve tapping)....	Marauder
Saddles for marble tops .....	Marginal
Tops, fitted with lugs for marble.....	Marksman
“ “ “ saddles for marble.....	Martingal
Wall Boxes, Detroit Plant .....	Matadore
“ “ Titusville Plant .....	Maternity

## Ideal Sectional Boilers

Water		Steam	
Number	Cipher Word	Number	Cipher Word
W-15-4 .....	Society	S-15-4 .....	Solnerset
W-15-5 .....	Socatrine	S-15-5 .....	Soldanel
W-15-6 .....	Socinian	S-15-6 .....	Solandrie
W-15-7 .....	Socoger	S-15-7 .....	Solatium
W-15-8 .....	Sociable	S-15-8 .....	Solarize
185.....	Socratism	085.....	Solutive
186 .....	Sodality	086.....	Solvable
187.....	Sodomite	087.....	Solvency
W-21-5 .....	Soulless	S-21-5 .....	Sparkle
W-21-6 .....	Sourness	S-21-6 .....	Speaker
W-21-7 .....	Sovereign	S-21-7 .....	Specific
W-22-5 .....	Sokalager	S-22-5 .....	Sojamiter
W-22-6 .....	Sokemtus	S-22-6 .....	Sojarstin
W-22-7 .....	Sokingust	S-22-7 .....	Sojastipe
W-22-8 .....	Sokratter	S-22-8 .....	Sojumfrye
245.....	Softness	045.....	Sombrous
246.....	Soiress	046.....	Somnolence
247.....	Sojourned	047.....	Sonatas
248 .....	Solaces	048.....	Songsters
W-28- 5 .....	Sommiter	S-28-5 .....	Sonnagube
W-28- 6.....	Somologes	S-28-6 .....	Sonnextus
W-28- 7.....	Somopitus	S-28-7 .....	Sonnighte
W-28- 8.....	Somoruser	S-28-8 .....	Sonnamber
W-30- 5.....	Sophistry	S-30-5 .....	Sorcerous
W-30- 6.....	Soporous	S-30-6 .....	Sordidly
W-30- 7.....	Soporific	S-30-7 .....	Sorghums
W-30- 8.....	Sopranos	S-30-8 .....	Sorrowful
W-36- 5.....	Solarizer	S-36- 5 .....	Sosteeming
W-36- 6.....	Solixsus	S-36- 6 .....	Soscratter
W-36- 7.....	Solmandus	S-36- 7 .....	Soscumer
W-36- 8.....	Solegardus	S-36- 8 .....	Sosiphite
W-36- 9.....	Solyetter	S-36- 9 .....	Sosediger
W-36-10 .....	Solgazette	S-36-10 .....	Sosejuger



# Telegraph Code—Continued

## Ideal Sectional Boilers—Continued

Water		Steam	
Number	Cipher Word	Number	Cipher Word
W-48-6.....	Solpugid	S-48-6.....	Sotadic
W-48-7.....	Solfarine	S-48-7.....	Sothiac
W-48-8.....	Sophomore	S-48-8.....	Sorrowed
W-48-9.....	Soricine	S-48-9.....	Sorrancer
W-48-10.....	Sortition	S-48-10.....	Soroize

## Ideal Sectional Coke Boilers

Number	Cipher Word	Number	Cipher Word
W-24.....	Saltish	S-24.....	Satiate
W-25.....	Saltpetre	S-25.....	Satirize
W-26.....	Salutory	S-26.....	Saturate
W-27.....	Salute	S-27.....	Sauciness
W-35.....	Sameness	S-35.....	Saunter
W-36.....	Sanative	S-36.....	Savage
W-37.....	Sanctify	S-37.....	Savant
W-45.....	Sanguine	S-45.....	Scabbard
W-46.....	Sapidity	S-46.....	Scaffold
W-47.....	Sapless	S-47.....	Scallop
W-55.....	Saracen	S-55.....	Scatter
W-56.....	Sarcasm	S-56.....	Scenery
W-57.....	Sardine	S-57.....	Sceptical
W-58.....	Satanic	S-58.....	Scholastic
W-59.....	Satelite	S-59.....	Scientific

## Ideal Sectional Water Heater

Number	Cipher Word	Number	Cipher Word
W-14.....	Jolliness	W-16.....	Joyancy
W-15.....	Joviality	W-17.....	Journalist

## Ideal Laundry Heaters

Number	Cipher Word	Number	Cipher Word
A-1.....	Kingbird	3.....	Kingfish
2.....	Kingcraft	1-C.....	Kingtoad

## Arco Water Heaters

Number	Cipher Word	Number	Cipher Word
10.....	Queenbird	15.....	Queenfish
12.....	Queencraft		

# Telegraph Code—Continued

## 1908 Premier Boilers

Steam		Water	
Number	Cipher Word	Number	Cipher Word
1015 .....	Nabatite	1115 .....	Napkinweb
2015 .....	Nabobden	2115 .....	Naplesster
3015 .....	Naberhad	3115 .....	Nappisen
1018 .....	Nackernan	1118 .....	Narrateld
2018 .....	Nacremon	2118 .....	Narrowdon
3018 .....	Nacritest	3118 .....	Narribow
1021 .....	Nadirsen	1121 .....	Nasalfin
2021 .....	Nadinent	2121 .....	Nascentor
3021 .....	Nadagamen	3121 .....	Naspheren
4021 .....	Nadrobil	4121 .....	Nasreddor
1024 .....	Nankinbel	1124 .....	Nationed
2024 .....	Nantonvil	2124 .....	Nativeman
3024 .....	Nanperton	3124 .....	Natronesse
4024 .....	Nansenite	4124 .....	Naturged
1027 .....	Namlinton	1127 .....	Nautical
2027 .....	Nambytor	2127 .....	Nautilaus
3027 .....	Nammerone	3127 .....	Nautivor
4027 .....	Namgeddor	4127 .....	Nauterman

## Junior Boilers

Steam		Water	
Number	Cipher Word	Number	Cipher Word
1500 .....	Cabalist	1501 .....	Cachexion
1600 .....	Cabbagine	1601 .....	Cacochymy
1800 .....	Cabriolet	1801 .....	Cacodemon
1900 .....	Cachalot	1901 .....	Cacography

## Junior Boilers or Water Heaters

Water		Steam	
Number	Cipher Word	Number	Cipher Word
0 .....	Jubilant	201 .....	Jurist
10 .....	Jubilee	301 .....	Justices
12 .....	Judgment	302 .....	Juvenile
20 .....	Judicial		
22 .....	Jugular		
30 .....	Juciness		
32 .....	Juniper		

## Premier Juniors

101 .....	Kangaroo
121 .....	Keelsons
122 .....	Kennels
151 .....	Ketchup
152 .....	Kinology
181 .....	Kiosks



# Telegraph Code—Continued

## Premier Boilers

### For Soft Coal

Steam		Water	
Number	Cipher Word	Number	Cipher Word
D 015	Weakened	D 152	Wearily
D 018	Wealthy	D 182	Weathered
D 021	Weazened	D 212	Whimsical
D 022	Weighable	D 213	Whipstaff
D 025	Welfare	D 242	Whittles
D 026	Wellbred	D 243	Wholesome
D 028	Wheatened	D 282	Willfully
D 029	Wheedles	D 283	Windfall
D 032	Whetstone	D 322	Windlass
D 033	Whiffle	D 323	Windburst

### For Hard Coal

Steam		Water	
Number	Cipher Word	Number	Cipher Word
C 015	Winterly	C 152	Witticism
C 018	Wishbone	C 182	Womanhood
C 019	Wistfully	C 183	Womankind
C 020	Wonderful	C 211	Wretchedly
C 021	Wonderment	C 212	Wristband
C 022	Wondrous	C 213	Wryness
C 024	Wondrously	C 241	Wringers
C 025	Woodbine	C 242	Wrinkled
C 026	Woodchuck	C 243	Workmanly
C 027	Woodcraft	C 281	Workshop
C 028	Worshipful	C 282	Worldling
C 029	Worsteds	C 283	Worldly
C 031	Wrangler	C 321	Worrier
C 032	Wrathfully	C 322	Woolgrower
C 033	Wretched	C 323	Wooliness

## Portable Boilers

Water		Steam	
Number	Cipher Word	Number	Cipher Word
13	Preamble	103	Pressman
14	Precepts	104	Prestige
15	Precinct	203	Pretence
24	Precious	204	Pretex
25	Precipic	205	Prevails
26	Precision	303	Prickled
34	Preclude	304	Priestly
35	Precocity	305	Primary
36	Preface	403	Primness
37	Pregnable	404	Princess
44	Prejudice	405	Priores

# Telegraph Code—Continued

## Portable Boilers—Continued

Water		Steam	
Number	Cipher Word	Number	Cipher Word
45.....	Prejudge	504.....	Prisoner
46.....	Prelates	505.....	Pristine
47.....	Premium	506.....	Prismatic
55.....	Premonish		
56.....	Presbyter		
57.....	Prescient		
58.....	Presents		

## Invincible Boilers

Water		Steam	
120.....	Indignant	113.....	Incased
130.....	Indiscreet	114.....	Incense
230.....	Indocility	223.....	Inception
240.....	Inefficacy	224.....	Incessant
330.....	Infringes	225.....	Incident
340.....	Ingenuity	333.....	Incipient
430.....	Ingrained	334.....	Incisive
440.....	Ingredient	335.....	Inclement
450.....	Injunctions	443.....	Inclined
530.....	Innocence	444.....	Incrusted
540.....	Innovation	445.....	Incubate
550.....	Inordinate	554.....	Incumbent
		555.....	Incursion
		556.....	Incurvity

## Arco Boilers

Water		Soft Coal	Steam
1-19-W.....	Lancinate	1-19-S.....	Laborious
1-22-W.....	Lapidary	1-22-S.....	Lacerated
1-25-W.....	Lastingness	1-25-S.....	Lamantine
1-28-W.....	Laureate	1-28-S.....	Lamentable
1-31-W.....	Laudable	1-31-S.....	Lamelose
1-34-W.....	Laurentian	1-34-S.....	Lambdoidal

Water		Hard Coal	Steam
2-19-W.....	Landloping	2-19-S.....	Labyrinth
3-19-W.....	Laumontite	3-19-S.....	Labroid
2-22-W.....	Lassitude	2-22-S.....	Lackaday
3-22-W.....	Lauraceous	3-22-S.....	Laccolite
2-25-W.....	Laudatory	2-25-S.....	Lamella
3-25-W.....	Laurifous	3-25-S.....	Lambaste
2-28-W.....	Lawfulness	2-28-S.....	Laminated
3-28-W.....	Lawgiving	3-28-S.....	Lambative
2-31-W.....	Lawmonger	2-31-S.....	Lambrequin
3-31-W.....	Lawsonia	3-31-S.....	Lambskin
2-34-W.....	Lawyerlike	2-34-S.....	Lamellary
3-34-W.....	Lawmaking	3-34-S.....	Lampless

# Telegraph Code—Continued

## Standard Boilers

### Water

Number	Cipher Word	Number	Cipher Word
15-1-W.....	Gaebrinus	25-4-W .....	Gamesomed
15-2-W.....	Gaelinous	25-5-W.....	Garmentur
17-3-W.....	Gainlesso	28-3-W.....	Garnisher
17-4-W.....	Galatinet	28-4-W.....	Garrisons
17-5-W.....	Gallantry	28-5-W.....	Gasolines
19-3-W.....	Galleries	31-3-W.....	Gathering
19-4-W.....	Gallivant	31-4-W.....	Gaudiness
19-5-W.....	Galloping	31-5-W.....	Gaugeable
22-3-W.....	Galvanism	34-3-W.....	Gauntlets
22-4-W.....	Galvanist	34-4-W.....	Gauziness
22-5-W.....	Galvanozo	34-5-W.....	Gazements
25-3-W.....	Gamenesso		

## Fire Box Boilers and Parts

	Cipher Word
Acme Fire Box only .....	Fibrillar
“ “ “ Boiler with castings.....	Fickleness
“ “ “ “ “ “ and with steam trimmings .....	Fictitious
Tapped for Steam.....	Fidelity
“ “ Water.....	Fiducial
Front Arch Plate for Acme Fire Box Boiler (No.....) .....	Fiendishly
Rear Covering Plate and Slide Damper.....	Figmental
Steam Trimmings, complete.....	Filaments
Compression Valves, $\frac{3}{8}$ -inch.....	Filanders
Damper Regulator, complete .....	Filchings
Safety Valve (....inches) .....	Filiation
Steam Gauge.....	Filibuster
Water Column Castings .....	Filigree
“ “ Complete.....	Filtering
Fire Door and Frame .....	Fringed
Ash Pit Front .....	Friskers
Large Soot Door .....	Frittered
Small Soot Doors .....	Frolicer
Acme Shaking Grates .....	Frontier
To contain (.....) tubes instead of regular....	Fructify

## IDEAL Cylindrical Steel Boilers

Size of Boiler	Cipher Word	Size of Boiler	Cipher Word
1200.....	Abdicate	2600.....	Ablative
1500.....	Abditory	3000.....	Abnegate
1800.....	Abduction	3600.....	Abolition
2200.....	Aberance	4500 .....	Abrasion

# Telegraph Code—Continued

## Heating Specialties, Etc.

Cipher Word

Air Valves, Compression, Wood Wheel, O. S...	Reaction
" " " Improved Wood Wheel...	Reappear
" " " Key, O. S.....	Reapers
" " " Improved Key.....	Rebelled
" " Imperial Automatic.....	Rebounded
" " " " Lock and Shield	Rebuffed
" " " " Straight Shank..	Rebuilt
" " " Libra Automatic .....	Rebuking
" " " Norwall Automatic Air and Vacuum	Recapriter
" " " Norwall .....	Recanning
" " " Norwall Siphon .....	Recamier
" " " Allen .....	Recapitere
" " " Russell Automatic.....	Recasts
" " " Spring, Self Closing .....	Reception
" " " Victor Automatic, Style 2 .....	Rechoose
Asbestocel .....	Recharge
Asbestos Covering, Molded ( . . feet of).....	Recipes
" " Cement, Plastic ( . . . pounds of) ....	Recipient
Asphaltum, Black ( . . . gallons of) .....	Recitals
Auxiliary Water Heater .....	Reckless
Beam Clamps, adjustable .....	Reckmann
Boiler Feeder, Automatic .....	Recitation
Bronze, Pale Gold ( . . . pounds of) .....	Reckoned
" " Rich " ( . . . " " ) .....	Reckoning
Bronzing Liquid ( . . cans of) .....	Reclaimed
Brushes, Radiator .....	Recoined
" " Fitch .....	Recomand
" " Flue .....	Recuride
Cement, Plastic Asbestos ( . . . pounds of)....	Recognized
" " Ideal Iron .....	Recopyfy
Covering, Wool Felt, Molded ( . . . feet of)....	Recondite
" " Asbestos Molded ( . . . feet of) .....	Reconnoiter
Diaphragm, Rubber .....	Recorders
Distributers, O. S. (No. ....)	Rectitude
Elbows, Union (No. ....)	Rectory
Enamel ( . . . cans of) .....	Recuperate
Floor and Ceiling Plates, Ajax, Black .....	Recurrency
" " " Imperial .....	Recusant
" " " Russell, N. P. ....	Redolence
" " Plates, B. & C., black .....	Recrement
" " " N. P. ....	Recreative
Ceiling " " black .....	Recruitment
" " " N. P. ....	Rectangles
Gauges, Steam .....	Reelection
" " Altitude .....	Refectory
Japan, Maroon ( . . . cans of) .....	Refinement



# Telegraph Code—Continued

## Heating Specialties, Etc.—Continued

Cipher Word

Marble Tops for Radiators, Tennessee .....	Reflection
Marble Tops for Radiators, Italian .....	Refluxing
O. S. Distributers (No....) .....	Refractory
Pipe Bending Forms .....	Regnative
Pipe Hangers, Adjustable .....	Regandus
Pipe Threading Machines, Borden, Size— .....	Regramme
“ “ “ Toledo .....	Regometre
Putty for Boilers (. . . lb. can) .....	Regiments
Paste, Pipe Joint, Ideal .....	Regustor
Paste, Pipe Joint, Frazers .....	Regulate
Reamers Ideal Burring .....	Regigrand
“ Improved .....	Regummed
Registers, Japanned, black .....	Registrate
“ “ N. P. ....	Rehearsal
“ Plated .....	Reiterate
Regitherm, Sylphon, Ideal ..	Rejectom
Regulators, Powers' (No....) .....	Relapse
Regulator, Sylphon No. 22 .....	Relamper
“ “ “ 42 .....	Relaughed
“ “ “ 43 .....	Remorize
“ “ “ 44 .....	Rematting
Shields, Radiator (with vapor pan) .....	Relentless
“ Radiator (without vapor pan) .....	Religion
Tank Brackets .....	Remmount
Tanks, Expansion, Galvanized Steel (No....) .....	Relinquish
“ “ (No....) with Trimmings .....	Reluctant
“ “ Automatic, Wood Case (No....) .....	Remedies
“ Extra Heavy, Black Steel, Horizontal (...gallons) .....	Remittal
Tanks, Extra Heavy, Black Steel, Vertical (....gallons) .....	Remissible
Tanks, Storage, Black Steel, Horizontal (... gallons) .....	Remission
Tanks, Storage, Black Steel, Horizontal (with black pipe coil) (...gallons) .....	Remiss
Tanks, Storage, Black Steel, Horizontal (with galvanized pipe coil) (...gallons) .....	Remorse
Tanks, Storage, Black Steel, Vertical (... gallons) .....	Remorseful
Tanks, Storage, Galvanized, Horizontal, (... gallons) .....	Renounce
Tanks, Storage, Galvanized, Vertical (...gallons) .....	Renowned
Thermometers, Straight .....	Reorganize
“ Angle .....	Repairs
Tool Chest, Style A, One Drawer .....	Repartee
“ “ “ A, Two Drawers .....	Repagnal
“ “ “ C .....	Repellent
“ “ “ D .....	Replicant



# Telegraph Code—Continued

## Heating Specialties, Etc.—Continued

Traps, Steam, Nason (No.....)	Reparation
Valves, Check, No. 741, Brass.....	Reprieved
“ Gate, No. 335, Iron Wheel, Brass.....	Reprimand
“ “ No. 373, Wood “ “ Union.....	Republican
“ Gate, Norwall.....	Reprisale
“ Globe, No. 178, Iron “ .....	Requisite
“ “ No. 189, Wood “ Union.....	Rescuers
“ Improved Hot Water, Bonnetless, Quick-Opening .....	Requitting
“ Hot Water, Bonnetless, Quick-Opening (No....)	Residence
“ Hot Water, Bonneted, Quick-Opening (No....)	Resistance
“ Hot Water, Straightway, Quick-Opening (No.....)	Resolution
“ Unique Water.....	Resoplin
“ Improved Screw Stem, Steam... ..	Retinged
“ “ Quick-Opening, Water.....	Retrappier
“ Packless Radiator, Norwall.....	Retreatix
“ Pop, Safety, Ideal.....	Retrench
“ Pressure-Regulating, Ideal.....	Retrospect
“ Steam, Angle, Screw-Stem, with Jenkins Disc (No....)	Revengeful
“ Angle, Screw-Stem, with Brass Discs (No....)	Revenged
“ Steam, Angle, Quick-Opening (No....)	Revoltig
“ Screw-Stem, Steam, with Union.....	Revolture
“ Steam, Corner, Screw-Stem (No....)	Revolver
“ to be equipped with lock and shield...	Revolution
Vise, Combination Bench Pipe.. ..	Revocater
Vise, Toledo Pipe.....	Revoluble
Wool-Felt Molded Covering (.... ft. of).....	Reviewers
Wrenches, Spud, Style 1.....	Revoluting
“ “ Style 2.....	Revamping
“ Ideal Chain.....	Revastaton

*Honeywell Heat Generators -*  
*"Referable"*  
*Lucas Bullock*  
*#61*

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# THE IDEAL FITTER

